The AMSAT® Journal

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CONTENTS

AMSAT Field Ops Update 1
By Barry Baines, WD4ASW

Apogee View 3
by Robin Haighton, VE3FRH

Silent Key: John Branegan, GM4IHJ 4
by Pat Gowen, G3IOR and David Anderson, GM4JJJ

Straight Key Night Results 10
by Ray Soifer, W2RS

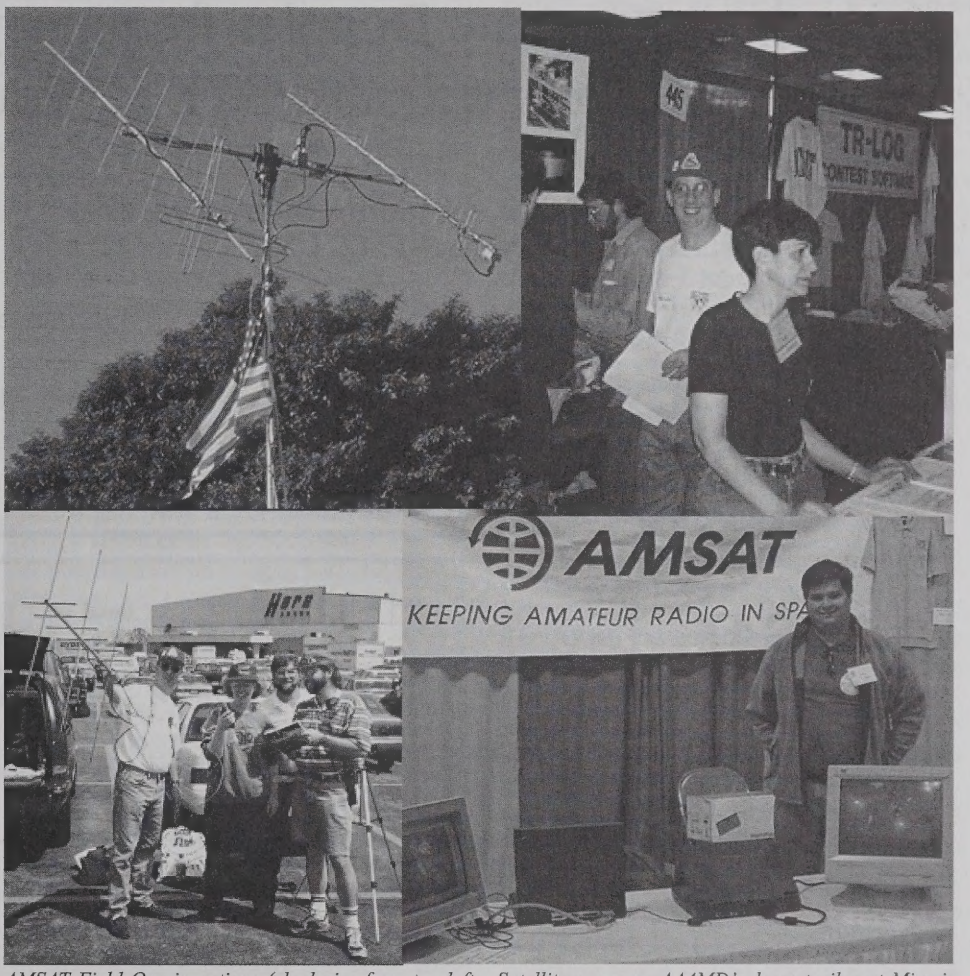
How Kids Can Talk to Space People 11
by Gene Chapline, K5YFL

What Happened During the AO-40 QSO Party? 14
by Lee McLamb, KU4OS

AMSAT-NA Space Symposium First Call forPapers 17

Report of the AMSAT Board of Director's Meeting 18
by Bill Tynan, W3XO

AMSAT Journal Telemetry 31



AMSAT Field Ops in action: (clockwise from top-left: Satellite array on AA4MD's demo trailer at Miami; Martha and James KD4DLA working the AMSAT booth at Dayton; Drew, KO4MA working the AMSAT booth at Miami; N1XAU, KD4DLA, N8RER working AO-27 at Dayton.

AMSAT Field Ops Update

The March/April issue of the *AMSAT Journal* is when we present our annual listing of AMSAT's Area Coordinators. In this issue you will find a listing of the 195 Area Coordinators in the US, Canada, and US Territories (plus two country representatives) who donate their time and energy to represent AMSAT within their respective communities.

[continued on page 5]

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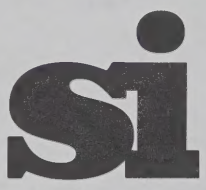

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The AMSAT Journal staff is always interested in article submissions. Whenever possible, submissions should be sent via e-mail to journal@amsat-na.org using plain text or word processor files; photos or figures in JPEG, GIF, or TIF formats. AMSAT-NA reserves the right to select material for *The AMSAT Journal* based on suitability of content and space considerations. The editors of this publications are volunteers giving freely of their talents, time, and efforts to produce *The AMSAT Journal*.

Apogee View

Your Board of Directors met on March 1 2003 to review the AMSAT-NA Financial and Project situation. I asked for this meeting as it appeared to me that we are not generating sufficient Project Funding to meet our expenses and thus our launch dates for Eagle, which was to be launched in 2006.

This does not affect the launch of ECHO which, if all continues to go according to current plans, will be launched later this year.

We have been offered an attractively priced launch for Eagle in 2004/5, however with sincere regret we are unable to meet the design, build, and test schedule for that opportunity, and certainly we do not want to launch a satellite that could be prone to early failure.

Also to meet a 2004/5 schedule would require a massive fund raising program involving many volunteers. Of course one way to increase our available funding is to cut costs, and a detailed review of our costs took place. We were able to find a few places where we could reduce our projected costs of running the organization , but these are quite small. Any major reductions would reduce services to the membership which the board felt are an integral part of AMSAT-NA.

The results of our meeting are:

1) To develop several new fund raising programs, to review the possibilities of sharing commercial satellites and letting commercial organizations share our satellites (using their own commercial frequencies).

2) To appoint a suitable Director of Business Development, preferably a retired Ham, with expertise in Business Development Activities.

3) To offer our knowledge and capabilities to educational organizations and similar bodies who may wish to develop research satellites.

4) To Increase membership and offer useful premiums to renewing and new members and offer an incentive for members who bring in new members.

5) As AMSAT-DL is proceeding with the design and building of P3E to be launched next year or early in 2005 and as the functionality of these satellites is similar, we feel that launching of two similar satellites at the same time would be a waste of effort. Particularly should there be a launch failure.

6) Develop an AMSAT Annual Report for distribution to members and to potential major supporters.

7) To continue our close liaison with ARRL and to develop working relationships with other similar amateur groups who have an interest in space and satellites.

It was agreed by the Board that the days of being able to build a satellite for relatively few dollars and then easily find a launch vehicle capable of launching it into the desired orbit, are over. Our satellites while being smaller, and having greater functionality, are costing more to launch, it is regrettable that costs are increasing exponentially and new fund raising methods are going to be necessary especially in harder financial times.

The programs listed above, combined with the President's Club donations, and our other means of raising funds will, we hope, meet our future needs. Your ideas however are always welcome.

73,

Robin VE3FRH
President, AMSAT-NA ■

ARRL comments in support of AMSAT-NA petition

The ARRL has commented in favor of an AMSAT-NA Petition for Rulemaking that seeks to change an FCC rule regarding pre-space notifications for amateur satellite service stations. AMSAT-NA wants the rule changed to require a single, written pre-space notification (or information document) within 30 days after receiving a launch commitment.

The current rule requires two pre-space notifications: the first at 27 months before initiating space station transmissions and the second at five months prior, even if no information has changed. The ARRL said that because finding affordable launch opportunities can be difficult and often involves last-minute decisions, ''the 27-month notice requirement imposes an unreasonable and practically impossible compliance burden."

AMSAT currently must seek a waiver of the requirement for essentially every launch and the FCC has routinely granted such waivers, the ARRL noted. AMSAT-NA President Robin Haighton, VE3FRH, expressed his appreciation to ARRL for its support of its petition. ■

Silent Key: Commander John Branegan RN, C.Eng, MIEE, GM4IHJ, died 9th February 2003 aged 75 years

by Pat Gowen G3IOR & David Anderson GM4JJJ

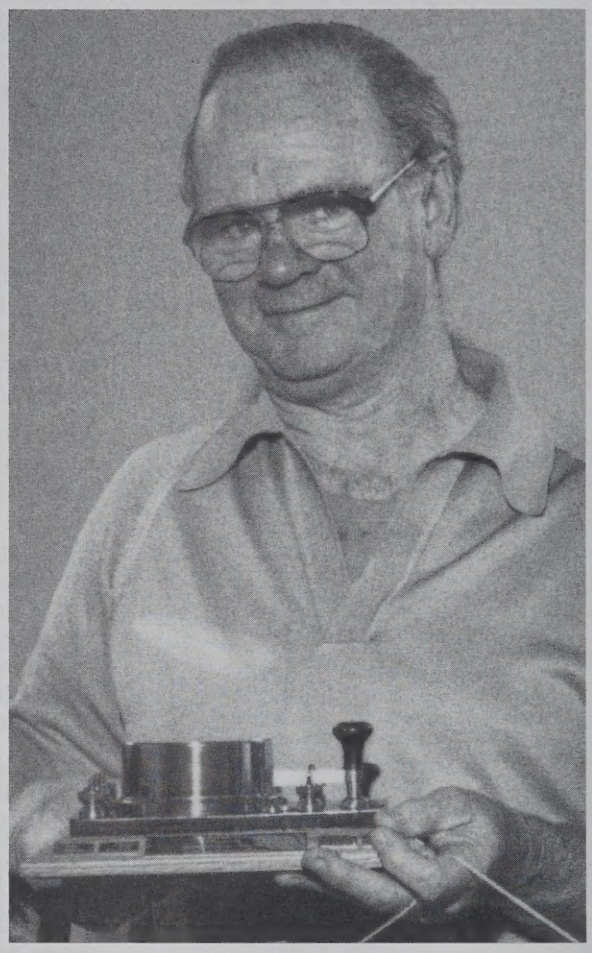
Having joined the Royal Navy when he was 15 and until his early retirement, John Branegan was a Communications, Radar, Guidance and Navigations systems expert on Aircraft Carriers and Nuclear submarines specialising in the communication problems of the very difficult Arctic radio conditions. After retirement he dropped his title completely to become just John Branegan, GM8OXQ, later to be GM4IHJ.

John brought his experience and expertise with him to couple it with his remarkable understanding of complex mathematics, Spherical and Keplerian trigonometry, Boolean algebra, astronomy, geography as well as ancient history, geology and science in general to benefit the Amateur Radio community, satellite communications and AMSAT in particular. He wrote the very first advanced satellite tracking programs, later the more complex forms for the elliptical orbiters, all to run on the early home computers such as the Sinclair ZX-81, Spectrum and the QL. All proceeds from these went to fund AMSAT, whilst he also gave much of his personal income to provide computers and Amateur Radio equipment to others in countries who had no way of obtaining or affording such, so enabling them too to operate on the new Amateur Radio satellites. Many operators in the USSR, Eastern Europe and the third world benefited from GM4IHJ's generosity.

John was a true experimenter. He spent many hours daily monitoring the bands and satellites with his copious array of equipment to record Auroras, Auroral-E, Sporadic-E, FAI, MS, etc. always carefully noting the findings in his written records. As a result of his extensive observations he was able to provide a deep understanding of the mechanism of many modes of HF, VHF and UHF propagation, satellite sub-horizon, Arctic, Antarctic, Equatorial and Antipodal paths in particular. From 1989 to 2001 John wrote his weekly 'SATGEN' bulletins and distributed them worldwide by means of Packet Radio and Internet. They were a mine of both topical and historical information providing sound comprehensive practice based on firm scientific principles. All 682 'Satgen's' can be found at: -
http://www.amsat.org/amsat/articles/satgen/chron.html

He also published numerous papers in the early *AMSAT Newsletter* and the later *AMSAT Journal* and further authored the '*The Space Radio Handbook*' published by the RSGB. This treatise highlights his experimental approach and provides essential reading to anyone involved in space and radio communications. John loved to educate others in this field, and would travel to amateur radio club meetings and conventions to give guest talks on subjects on satellites and how the ionosphere works. He produced many booklets on his own printer, bound them, and supplied them freely to any who requested them.

GM4IHJ was a bachelor, which is not that surprising when one considers that few (if any) wives would permit a six foot dish at the window, a major collection of many pieces of equipment and books within the main living room, a festoon of antennas on the chimney, in the loft, on the roof and in the garden of his small bungalow.



John, GM4IHJ, accepting the GM3EHI Award

No wife — but John had many children! The youngsters of his village used to love to come to his house to learn about all about fossils and falling stars, volts and volcanoes, moonbounce and Mars. He had many watercolours that the kids had produced for him displayed on his living room and shack walls.

Prior to his illness, John was a very fit and able man. Cycling many miles every day up steep Scottish hills to shop or to visit his friends, his energy seemed endless. In his earlier days he actually climbed Mount Kilimanjaro! But one year ago it became necessary for John to have a pacemaker fitted. This curtailed the use of his transmitters, but it certainly didn't stop him from continuing with his receiving experiments. Sadly, these will be no more as John passed away on the morning of Sunday February 9th 2003 aged 75 years. At John's personal request he had a humanist funeral attended by many of his close friends on Thursday, February 13, where some of his favourite pieces of opera were played instead of hymns. Opera was yet another of John's delights!

He will live on in the hearts and minds, interests and activities of his many friends, followers and students, and from the great deal of knowledge that he has left us. We shall all miss him!

John Branegan, GM4IHJ, R.I.P. ■

Field Ops Update: Area Coordinator Volunteers & Upcoming Hamfests

Barry A. Baines, WD4ASW, *wd4asw@amsat.org*

Continued from Page 1 ...

Here is AMSAT's annual listing of our Area Coordinators. The Area Coordinator listing is also available at the AMSAT Web site (www.amsat.org/amsat/fieldops/. These volunteers may give programs to local clubs, serve as 'Elmers' to folks getting started in amateur satellites, and establish AMSAT nets on local repeaters. Other activities that Area Coordinators have done include organizing local AMSAT gatherings and supporting AMSAT Field Day activities. They serve as 'Ambassadors of AMSAT' in that they become the local contact for people needing information on the amateur satellite program. Through close coordination with AMSAT Office Manager Martha Saragovitz, who provides AMSAT banners and materials when requested, they represent AMSAT at hamfests and swapmeets as well as lead AMSAT presentations at these gatherings. A number of volunteers have done AO-40, AO-27, and UO-14 demonstrations at hamfests, for example, which always generates interest and enthusiasm and which demonstrates to their communities what the amateur satellite program is all about.

AMSAT has been blessed by a number of people who have stepped forward to volunteer as Area Coordinators around the country. We currently have Area Coordinators in 47 states and 4 Canadian Provinces, as well as Puerto Rico, and the US Virgin Islands. Given the need to show the flag throughout North America, we continue to look for volunteers everywhere. You will note that there are three states where we don't have a designated Area Coordinator (Delaware, Idaho, and Wyoming) as well as 8 Canadian Provinces/ Territories. There are nine other states in which there is only one Area Coordinator (CT, KY, MT, NV, OK, SC, SD, WI, WV). Even in States where we have multiple Area Coordinators, we still lack Area Coordinators in heavily populated areas. In addition, we don't have even distribution of Area Coordinators around a given state.

AMSAT Will Be Attending These 2003 Hamfests

March		**July**	
Splitrock ARA, Parsippany, NJ 3/1		OH-KY-IN ARS, Cincinnati	7/26
Acadiana ARA, Rayne, LA	3/7-3/9	Arizona State Convention, Flagstaff	7/25-7/27
Roanoke Division Convention, Charlotte, NC	3/8-3/9	**August**	
Cherryville, NJ Repeater Association	3/16	West Gulf Division Convention, Austin, TX	8/1-8/2
North Shore ARC, Grayslake, IL	3/16	Alabama Section Convention, Huntsville	8/16-8/17
ARC of Parker County, Weatherford, TX	3/22	**September**	
Maryland State Convention, Timonium	3/29-3/30	Southwestern Division Convention, Long Beach, CA	9/5-9/7
Maine State Convention, Lewiston	3/28-3/29	Maryland/DC Section Convention, West Friendship, MD	9/6-9/7
April		Platiumum Coast ARS, Melbourne, FL	9/13
Amateur Electronic Supply Superfest , Milwaukee , WI	4/4-4/5	Alaska State Convention, Anchorage	9/14
North Carolina State Convention, Raleigh	4/13	Chicago FM Club, Grayslake, IL	9/27-9/28
Catawba Valley Hamfest, Morganton, NC	4/19	**October**	
Southeastern VHF Conference, Huntsville, AL	4/25-4/26	Virginia Beach Hamfest, VA (Dates not finalized)	10/4-10/5
May		Pacific Division Convention (Pacificon), San Ramon, CA	10/17-19
Dayton Hamvention	5/16-5/18	**November**	
Atlantic Division Convention, Rochester, NY	5/30-6/1	Georgia Section Convention, Lawrenceville, GA	11/01-11/02
Bergen ARA, Washington Township, NJ	5/31	Indiana State Convention, Ft. Wayne, IN	11/15-11/16
June		**December**	
Tennessee State Convention, Knoxville, TN	6/13-6/14	West Central Florida Section Convention, Tampa Bay	12/06
ARRL National Convention, HAM-COM Dallas,TX	6/20-6/22		
Milford ARC, Milford, OH	6/21		

Field Operations representation is particularly needed in areas such as California (Los Angeles), Florida (Panhandle), Illinois (Chicago), Massachusetts (Springfield-West), New Jersey (Newark and the Northern half of the State), New York (NYC and suburbs), Ohio (Cincinnati, Cleveland), Pennsylvania (Allentown/Northeast), Tennessee (Nashville-Memphis), and the DC area. In Canada, we can also use support in the Eastern Provinces (Prince Edward Island, Newfoundland, New Brunswick, Nova Scotia, and Quebec) as well as Saskatchewan and Manitoba.

The importance of having Area Coordinators in these areas as well as improving coverage in existing areas cannot be overstated. AMSAT's ability to increase interest in the amateur satellite program is heavily dependent upon creating and maintaining both individual interest and general knowledge within the Amateur Radio community. Our lack of volunteers to address these situations in areas throughout the country results in failure to develop support for the amateur satellite program, lost membership opportunities, and missed revenue through distribution of AMSAT materials. Given the cost of our satellite projects, building financial support for AMSAT is a key concern. More importantly, not being seen means that our message is not being heard.

The qualifications needed to serve as an Area Coordinator are simple:

- You must be a current member of AMSAT-NA
- Be willing to work with people
- Have an interest in representing the organization as your time and interests permit.

In order to maintain contact with members of our Field Ops Team and provide them with support materials as needed, we also require each Area Coordinator have Internet electronic mail capability. E-mail provides an easy and cost effective avenue for distributing information, sharing ideas, and responding to requests for support. Given the variety of satellites in current use and the diversity of interests, Area Coordinators are not expected to know everything about the amateur satellite program. What is important is that each Area Coordinator be willing to find answers to questions and follow up with individuals looking for assistance. That's why we require electronic access, so that everyone can get information from other Area Coordinators and respond to queries in a timely manner.

Speaking of AMSAT hamfest representation, there is both a 'good news' and 'bad news' story. In 2002, AMSAT volunteers represented AMSAT at 41 hamfests. Through the efforts of our volunteers, AMSAT collected a significant amount of revenue by offering AMSAT materials such as books, software, and trinkets as well as AMSAT memberships. Most importantly, volunteers were available to answer questions, build enthusiasm for the satellite program, and serve as resource persons to those wanting to learn more about getting started on satellites. During 2002, thousands of hamfest attendees were given the opportunity to learn more about the satellite program due to the efforts of our volunteers.

Clearly, AMSAT benefited greatly from the successes of our volunteers and we gratefully acknowledge their contributions.

AMSAT will once again have representation at various hamfests around the country in 2003. Assuming that AMSAT is at the same shows this year as in 2002 and based upon upcoming hamfest information provided on the ARRL website and other sources, we project that the AMSAT will be represented at the hamfests listed in Table 1 starting in March.

This list is not complete, as there are a number of smaller hamfests and swapfests in which AMSAT participated last year but that I don't have dates for in 2003 and so are not listed now.

The 'bad news' is that there are a number of significant hamfests where AMSAT does not have a presence. Our absence is due to the need to find volunteers to represent AMSAT. Specific examples of various ARRL State and Division Conventions and other events where AMSAT was not represented last year and which we need to be represented in 2003 are listed in Table 2.

Clearly, there are opportunities for AMSAT to establish a much greater presence if we can find volunteers to represent AMSAT at more hamfests as well as serving as Area Coordinators. In the past we've been unable to find 'local' volunteers to do these shows. If you're interested in representing AMSAT at these or other hamfests, please contact Martha Saragovitz via e-mail (martha@amsat.org) or at the AMSAT office (tell. 301-589-6062). If you're interested in serving as an Area Coordinator or learning more about the Field Organization, please contact me via e-mail: wd4asw@amsat.org

Telephone: 904-398-5185 (evenings) or, 904-359-1933 (work) ■

AMSAT Opportunities for Representatives for 2003

International DX Convention, Visalia, CA	5/2/-5/4	Northwestern Division Convention, Seaside, OR	7/14-7/15
Alabama State Convention, Birmingham	5/3-5/4	Oklahoma State Convention, Oklahoma City	7/18-7/19
South Carolina State Convention, Greenville	5/03	Kentucky State Convention, Lexington	8/10
Colorado State Convention, Estes Park	5/31-6/01	Kansas State Convention, Salina	8/17
Georgia State Convention, Marietta	6/7	Missouri State Convention, Columbia	8/23
Iowa State Convention, Sioux City	6/13-6/14	West Virginia State Convention, Weston	8/23-8/24
Eastern Pennsylvania Section Convention, Bloomsburg	6/14	Western Pennsylvania Section Convention,	9/7
Utah State Convention, Bryce	7/11-7/13	Michigan State Convention, Holland	10/31-11/01
Southeastern Division Convention, Gainesville, GA	7/12	Louisiana State Convention, Monroe	11/14-11/15

AMSAT-NA Area Coordinators

State	Call	Name	Address	City	Zip	Home Phone	E-mail
AK	AL7EB	Ed Cole	P.O. Box 8672	Nikiski, AK	99635	(907) 776-5829	al7eb@amsat.org
AK	N1TX	Larry Ledlow	P.O. Box 84978	Fairbanks, AK	99708	(907) 488-8399	n1tx@amsat.org
AK	WL7BQM	Mike West	P.O. Box 452	Sterling, AK	99672	(907) 262-5930	wl7bqm@amsat.org
AL	K2SAT	Joel B. Black	Rte. 3 Box 52	Eutaw, AL	35462	(205)372-2187	k2sat@amsat.org
AL	KE4BF	Jimmy Potter	94 Widgeon Drive	Scottsboro, AL	35769	(256) 259-1199	ke4bf@amsat.org
AL	KX4Y	Dieter Schliemann	1803 Roseberry Drive	Scottsboro, AL	35769-3960	(256) 259-3900	kx4y@amsat.org
AL	N4NR	Dennis Dease	2588 Royal Way	Pelham, AL	35124	(205) 733-9975	n4nr@amsat.org
AL	N8DEU	Tim Cunningham	109 Woodrow Balch Drive	Huntsville, AL	35806	(256) 837-8940	n8deu@amsat.org
AR	KC5MLC	Gary Hollowell	2011 Hwy 32 West	Ashdown, AR	71822	(870) 542-7158	kc5mlc@amsat.org
AR	WC5I	Mark Manes	109 Maple Shade Road	Alma, AR	72921	(501) 632-4276	wc5i@amsat.org
AZ	AA7KC	Jim Weisenberger	6502 E. Pebble Dr.	Mesa, AZ	85215-2938	(602) 985-2641	aa7kc@amsat.org
AZ	N7HPR	Steven Bible	2470 W. Thompson Way	Chandler, AZ	85248	(480) 726-9953	n7hpr@amsat.org
AZ	W7LB	Larry Brown	2721 S. Black Moon Dr.	Tucson, Az	85730	(520) 886-1957	w7lb@amsat.org
AZ	K1SC	Sandy Cole	4438 San Pedro Ave.	Sierra Vista, AZ	85650	(520) 378-2201	k1sc@amsat.org
CA	AA6PA	Bill Rausch	6249 Marguerite	Newark, CA	94560	(510) 299-0147	aa6pa@amsat.org
CA	K7RR	Clifford Buttschardt	950 Pacific Street	Morro Bay, CA	93442	(805) 772-2132	k7rr@amsat.org
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CO	K9YKL	Jim Young	401 CR 413	Granby, CO	80446-9021	(970) 887-1014	k9ykl@amsat.org
CO	N0NTX	Tom McDaniel	4255 Shining Way	Colorado Springs, CO	80916	(719) 570-1465	n0ntx@amsat.org
CO	N0VSE	John B. Gubbins	1106 W. Arapahoe Road	Littleton, CO	80120	(303) 730-3992	n0vse@amsat.org
CO	W8YQD	Ashley Buss	103 Orion Street	Golden, CO	80401	(303) 278-2837	w8yqd@amsat.org
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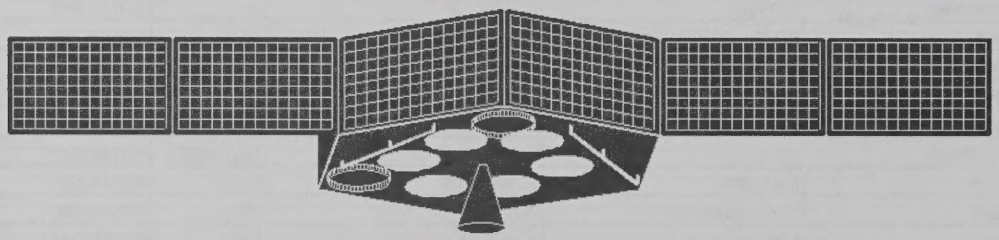

OSCAR Straight Key Night Winners Announced

Many thanks to all who participated in Straight Key Night on OSCAR 2003. Participation was up this year, producing a record 11 Best

Fist winners, all nominated by at least one operator they worked.

- Dave Rowan, G4CUO
- Lee Collins, K1LEE
- Jerry Brown, K5OE
- Cliff Buttschardt, K7RR
- Keith O'Brien, N4ZQ
- Mike Rudzki, N8MR
- Mal Preston, NP2L
- Stan Holden, W3QBK
- Andy Mac Allister, W5ACM
- Ron Cade, W6ZQ
- Alan Lyday, WC9C

See you all next year!

73, Ray W2RS

AMSAT QSL Bureau Reminder

Walt Rader, AMSAT QSL Bureau Manager, reminds you that there is a 15 cents per card charge for all stations outside US Postal districts. Many of you are sending less and that is costing AMSAT. Any questions concerning the Bureau can be sent to:

Walt Rader
3702 Allison St
Brentwood MD 20722

How Kids Can Talk to Space People

(Who are aboard the International Space Station)

by Gene Chapline, K5YFL

Courtesy ARRL Education Workshop, June 2002

We are the space people. When the International Space Station was occupied permanently in October, 2000, we became a species that will probably forever and always have some of its members away from the home planet. That fact, its implications and consequences, must now be part of our children's curriculum. We are no longer sending our kids out into the world, but into the universe.

There is an exciting way to open a window into space for students in a classroom. It's done by letting children talk directly to crewmembers on board the International Space Station by means of Amateur Radio. It's being done four to six times a month, and there's no lack of attention from the students. Immediately after one such contact an elementary school principal in Texas beamed, and fighting a big frog in her throat, said, "I think maybe we started some dreams this morning!" When students at a school in Mississippi completed a contact, their teacher exclaimed, "These students are going to have a very slow time of landing back on Planet Earth, and the parents are still on Cloud Nine." It's no secret that kids eagerly jump into learning everything about what excites them. As NASA's Director Sean O'Keefe (a father of three) said in March of 2002, "...if it excites kids, that is what is going to get to the kids."

The radio contacts are made through a program called Amateur Radio on the International Space Station (ARISS). ARISS is an international project, with U.S. participation by NASA, the American Radio Relay League (ARRL) and Amateur Satellite Corporation, NA (AMSAT), a non-profit corporation. In 1996 NASA wanted a single focus for the development and operation of Amateur Radio on the International Space Station, and ARISS was the solution. In 1997 Amateur Radio organizations from eight of the 16 nations participating in the Space Station signed a memorandum of understanding chartering ARISS. The international partners then divided up chores and duties in preparation for the occupation of the Space Station in the fall of 2000. The first ARISS radio contact with a school occurred in late November, 2000. Since then ARISS contacts have been made with other schools, museums and special events such as the 2001 National Boy Scout Jamboree.

So how does your group of kids get in line to talk to space people? This article tells you how to put together a successful ARISS contact, taking you through a four-step process: application; preparation; the contact; and, the morning after.

Application process

Yes, you start with paperwork. You have to apply. Get on the internet, go to **http://www.arrl.org/ARISS/ariss-ap.html**, and print out the application form.

Now fill it out. Completely. The volunteer mentors of the ARISS Operations team need to know all the telephone numbers, e-mail addresses and physical addresses that are requested on the form. They will have to pry them out of you later if you don't provide them at first. They must be able to communicate with you, especially during the last few days and hours preceding an ARISS contact.

When you get through the getting-to-know-you part of the application, you will then encounter questions asking you about radio equipment, coordinates and elevation. You must now ask yourself, "Do I want to have a telebridge contact or a direct contact?"

Telebridge contact

A telebridge contact is easy. It's done by telephone. The actual radio contact is through a ham station somewhere else in the world, and the audio is then carried to your location by a telephone connection provided by Worldcom, Inc., which sets up the connection and picks up the tab. A moderator will talk to you and your kids over a speakerphone before and after the actual contact. When radio contact is made with the Space Station, you will hear the crewmember over the speakerphone, and the students will ask questions over the speakerphone. It's simple. Your only technical responsibility is to provide a speakerphone of good quality, the kind used for teleconferences. Your local telephone company should be able to give you some guidance.

Photo 1: Astronaut Frank Culbertson, KD5OPQ, at the NA1SS operating position. (Photo Credit: NASA.)

Telebridge contacts can be scheduled at times convenient for you and your students, since your contact with the Space Station is not dependent upon the spacecraft passing over your location.

If you opt for a telebridge contact, skip the questions concerning equipment, antennas, coordinates and elevation, and go to the part of the application asking about your educational proposal.

Direct contact

A direct contact is made with Amateur Radio equipment set up at your location. If you are not a ham, you will have to seek out the help of hams in your area. The hams should have experience at satellite communication and should have the equipment necessary to accomplish a successful contact of ten minutes with the Space Station. You should be prepared to have wires, cables and antennas underfoot and overhead for a day or two. Everyone should be prepared to be flexible, diplomatic, and able to derive fun from the special circumstances and difficulties. Direct contacts can be very exciting because everyone gets to see the operation of the radio equipment.

Above: Art Passannante, KC5GQP, and the students at Lamar Elementary School in Greenville, TX make an ARISS contact in October 2002.

The application asks you to specify times and holidays during which it will be impossible or extremely inconvenient for you to gather your kids together. Be truthful in your response, or you may find that when your turn for a direct contact comes up, you are assigned a pass that you would rather not have. Time and tide and orbital mechanics wait for no one. When it's your turn, and the Space Station is due to pass over your location, it's step up, or go to the end of the line. The ARISS operations team tries to schedule contacts at reasonable hours, but unless you specify otherwise in the application, you may find yourself getting up before the chickens. If you should be assigned a dawn contact, just take some coffee, doughnuts and breakfast tacos for everyone at the contact site. It's all part of the fun.

If you opt for a direct contact, continue filling out the application questions concerning radio equipment, antennas, coordinates and elevation. A local ham who will be helping with the contact should fill out this section of the application. Make sure the answers are truthful, or at least will be true at the time of the contact.

Educational proposal

At the end of the application will be a request for you to set forth your educational proposal. Write one. Don't skip over the section. Talking to the space people is not just for the fun of it; it fulfills specific educational purposes and goals of NASA and the ARISS project. The educational proposal is extremely important. It should include specific answers to these specific questions:

- How will you integrate the contact into the curriculum of your school or the activities of a special event sponsored by a museum or youth organization.
- How will you involve as many grade levels as you can through essay contests, poster drawing, letter writing and similar activities.
- How will you get as much media coverage as possible? (The first two questions are more important than this third one.

Upon completion of the application, send it electronically or by mail to the ARRL at one of the appropriate addresses given on the form.

Preparation

In the fullness of time (some applicants waited five years, but the waiting time is now much, much shorter), perhaps 10 to 18 months, you will be notified by a mentor from the ARISS Operations team that your organization's turn is approaching. The mentor will review the application with you to make sure that it is accurate and current, and will answer any questions you may have.

Equipment

If you opted for a direct contact, you and the mentor will now begin to make sure that the equipment and antennas specified on the application form by the experienced Amateur Radio operator really exist in the form of an efficient station equipped with a primary station and a backup station.

The primary station should have a two-meter transceiver with frequency memory capable of operating in non-standard split-frequency mode. The transceiver should feed an amplifier putting out 80 to 150 watts of power into a 10 to 14-element circularly polarized yagi mounted on an az-el rotator controlled by a computer with an accurate satellite tracking program and tracking interface. A receive preamp would be helpful.

The backup station should have an uninterruptable power supply or a battery as its power source for a separate two-meter transceiver and amplifier with the same specifications as the ones for the primary station. The antenna may be an eggbeater-style vertical, a discone antenna, or a quarter-wave whip. Do not expect these backup antennas to do as good a job as a 14-element circularly polarized yagi antenna. Do not use a collinear or other vertical gain antenna, or you will have poor contact with the Space Station when it is overhead. The backup station is designed for operation if your building's AC power is lost. If you have a deep-cycle marine battery and a 600-watt inverter to power a computer and az-el rotator, you can go back to having a good antenna for the backup station.

Place your antennas in the clear, free of obscuration of the predicted path of the spacecraft. If trees or buildings will block the field of a ground-placed antenna, place the antenna on the roof of the building of the contact site. If the building has a flat roof, it easy to place a ten-foot section of tower on a base plate anchored by six cinder blocks. Place the az-el rotator and antenna

on top of the ten-foot tower. Run the coax down to the room below. It's that easy. One radio crew for an ARISS contact tried to get by with less than what they promised on their application. They used a four-element vertically-polarized yagi mounted four feet off the ground, and pointed through trees on both horizons. They made contact, but not for ten minutes.

Some hams will tell you that the specifications prescribed by this article are overkill. It's not overkill when you have ten eager youngsters ready to talk to an astronaut in space for the full duration of a ten-minute pass over their school. Some hams will tell you that they've made contact with the Mir space station or the International Space Station using just a quarter-wave whip antenna. They have, but not for ten minutes. They may tell you that they've worked through satellites using just a handheld transceiver and a handheld yagi antenna. They have, but not for ten minutes. They may have tasted success, but not for ten minutes. A successful ARISS contact lasts ten minutes, not four, nor five, nor six.

Choosing students

This part of the preparation is often the most difficult for a teacher or events administrator. Somehow only a few students must be selected to ask questions of the crew. It is beyond the scope of this article to suggest selection methods to those who work with such students daily. However, a suggestion on the number of students to be selected is in order. The magic formula seems to be ten students and twenty questions. A Space Station pass lasts ten minutes, enough time for about twenty questions to be asked and answered. If ten students ask one question each, going to the end of the queue after each question, each student will get at least one shot at asking a question. If more than ten students are in a queue, there is always a chance that someone will not get to ask a question. That is always disheartening for any kid, and is an absolute disaster for the little ones. No one wants to wipe tears from the face of an eight-year-old, and no one wants to see such a picture in the local newspaper.

Uplink information

Your mentor will ask that you provide some information that will be sent to the Space Station about 10 days before the contact. This "uplink information" will consist of two paragraphs of information about the school, the names of the students, and the questions that each will ask. The first paragraph about the school may consist of the school's history, it successes, or anything else that falls with the bragging rights category. The second paragraph should be a summary of the educational proposal, describing how the contact has been integrated into the curriculum or special activity. Then list the names of the students and their questions in the same order as they will speak to the astronaut, e.g.:

- Emily Gofirst: What is the ...?
- Steven Secondly: How is the ...?

Proceed until you run out of names and questions. If you have ten students who have two questions each, run through their names twice. For instance, in the example above, Emily would be Numbers 1 and 11; Steven would be Numbers 2 and 12.

This uplink information is very helpful to the astronaut who will be answering questions. It allows time to think and to prepare concise answers.

Systems checks

Successful ARISS contacts are the result of checking, rechecking, and checking again. During the day before the scheduled contact, do an end-to-end check of the primary and backup stations several times. Have someone with a handheld rig programmed with the Space Station's transmit and receive frequencies act as a proxy Space Station in rehearsal contacts. One ARISS contact failed because the ground station had its microphone gain control set to zero. An end-to-end check would have revealed the oversight.

- Update your computer's Keplerian elements a few hours before the contact using a source suggested by your mentor.
- Use WWV as a source to correct your computer's clock and everyone's watches.
- Make sure that you have a key to the contact site.
- Make sure your mentor has the correct telephone number for the contact site.
- Write a list of things to remember.
- Have someone with the same list help you remember.
- Have the students rehearse their questions. Run through several mock-up contacts using a chalk-board eraser as a microphone for the students to speak into. Instruct them to speak loudly, slowly and clearly.

The 24-hour notice

Your mentor will insist that you send an e-mail notice or a fax confirmation that you are ready 24 hours before the scheduled contact. That little notice will keep the entire process in motion. Little things mean a lot. If you do not send the notice, the contact may be cancelled so that the crew may do other things. The mentor will send you a form to use in composing the notice.

The contact

This part of the process is the easiest part for you. If all goes well and as rehearsed, you will be doing nothing. The contact is between the astronaut and the kids. It's for them only, not you. The adults on the ground stay away from the microphone and keep their lips zipped; no showboating or speechmaking. The ten precious minutes of the contact are not for you to speak, but to observe and enjoy.

When the signals from the Space Station fade over the horizon, the ten minutes will have passed away, and the contact will be over. The room will be silent for a moment before someone will yell or clap. You may then begin speaking if you wish.

Good luck. A teacher in South Carolina said that she knew an attempt at academic instruction would be a lost cause immediately after her junior high students made a contact. She instead let them view the movie "October Sky," the movie version of Homer Hickham's book, *Rocket Boys*. That strategy was in keeping with her goal of keeping her kids' enthusiasm and excitement for learning alive.

The morning after

The adventure ends as it began, with paperwork. You must file a final report. It may be filled out online at a NASA website, which your mentor will refer you to. The report becomes part of a file, which justifies the existence of the ARISS project and NASA's support of its educational goals. Your report helps to justify continued funding and help for the ARISS project. Your report helps to keep that window to space open for students.

Conclusion

The mechanical success of an ARISS contact is measured by ten minutes. The effective success of an ARISS contact is measured in units still to be determined. How wide have imaginations been broadened? How deep has curiosity gone? How many more questions are now being silently asked? What wondrous answers will come? ■

What Happened During the AO-40 QSO Party?

Or, why does everyone run so much transmit power to AO-40 on 435 MHz?

by Lee McLamb, KU4OS

Discussion on the air and posts to the AMSAT-BB e-mail reflector prompted me to once again consider why excessive power use on the uplinks to AO 40 has become the norm. There are several things which I believe contribute to this problem. In some cases it is an attempt to compensate for a simple lack of receive sensitivity. When operators hear the excessively strong L-band stations, they are misled into believing that their receive setup is performing well when in fact it is very marginal. The second problem is that people have been running so much power for so long that very few people are familiar with just how little power is truly required.

Some Day-to-Day Observations

The L-band rx AGC does not restrict users of this band to the recommended MB-10db signal level. As a result some stations attempt to achieve the same excessive levels using the 70cm uplink resulting in decreased U-Rx sensitivity due to activation of the receiver AGC. The U-rx AGC has been driven so high for so long that everyone now considers it normal to run 4 to 8 times the recommended 100w EIRP.

Prior to launch AO-40 articles were published in the *AMSAT Journal* listing 100w EIRP as all that would be needed for a good SSB uplink. I've mentioned this before on the AMSAT-BB and been told by regular operators that "those numbers just are not realistic". It is on this point that I find I must strongly disagree. Figure 1 shows both the L and U-Rx AGCs for a five consecutive orbit period sampled in December, 2002.

From Figure 1 you can see the following:

- Values of AGC are very similar no matter which part of the world is below AO-40.
- Even though almost every pass has L-band stations operating at levels equal to or stronger than the MB, the L-band AGC is almost completely inactive.

The good news is that AO-40 does have extremely sensitive receivers. The bad news is that **too few people ever** get to experience just how good AO-40's receivers really are.

So just how bad is it? Table 1 gives a break down of the numbers. As you can see from the December, 2002 data, half the time the AGC is above 7 db, two-thirds of the time it is above 6 db. This means that most people are having to run **four times** as much power as should be required over two thirds of the time. Based on this experience it is not surprising that most people mistakenly believe that 400-500w EIRP is required for good signals into AO-40.

But that's not all. As much as one third of the operating time the AGC gets up to 9 db. Now the power requirements are up eight-fold. Finally, almost a full quarter of the available transponder time is consumed with stations running **10 times** the required power or more. It becomes no great surprise that all too often we hear deep "fading" on the passband. I suspect that because fading is such a natural and frequent event on HF, it doesn't raise an immediate flag that someone is doing something wrong. One of the greatest benefits of satellite operation should be steady, predictable and reliable communications.

Until everyone recognizes that they must control their uplink power so that they are no more than 10 db **BELOW** the strength of the middle beacon, we will probably be doomed to this continuous and needless escalation of required uplink power. This also means that we must be willing to resist the temptation to immediately reach for the power knob when someone starts hammering at the AGC.

What happened during the AO-40 QSO Party?

The AO-40 QSO party was conducted from 0000z, 24 Jan 2003 to 2400z, 27 Jan 2003. It was hoped that stations would view this as an "operating event" and avoid the "big gun contester" mentality. Unfortunately this didn't happen. In fact, the uplink signal levels reached the point that not only were moderate and lower power stations excluded from participation, but the S2-Tx ALC began showing signs of increased activity as well.

I'll examine the following three sets of measurements decoded from AO-40's telemetry during the course of the AO-40 QSO Party:

- U-Rx AGC
- L1-Rx AGC
- S2-Tx ALC

U-Rx AGC

Figure 2 shows the U-Rx AGCs for the 5 consecutive orbit period of the QSO Party.

When I first looked at this chart and compared it with the one I made last December (Figure 1) there didn't appear to be as much difference as I expected. However, when I compared the distribution of AGC values between the two periods, the difference really stands out as you can see in Table 1 and Figure 3.

So just what do all the numbers tell us? First and most notable, the average AGC value jumped up by a full 6db. Table 1 gives a break down of the numbers as percentages. As you can see, stations running in excess of 10 times too much power occupied fully two-thirds of the entire QSO Party period. Stated another way, stations were running at least 1000w EIRP just to get the same downlink signal that 100w EIRP should normally provide. In addition, just over one-fourth of the event weekend showed stations running **20 to 32 times too much power!** Because of this, some stations, which under normal circumstances have perfectly

U-Band Receiver AGC		
AGC (dB)	%time at this level (sampled in December 2002)	%time at this level (during AO-40 QSO Party)
16-18	0.6	3.9
13-15	3.3	26.5
10-12	19.6	36.2
7-9	27.1	16.8
4-6	28.8	10.6
1-3	20.5	6.0

Table 1: Comparision of AGC Levels

adequate uplinks, were completely excluded from using AO-40 for long periods of time.

The result is that not only is use of the satellite disrupted for non-participants but also some stations that intended to join the QSO Party were unable to due to the high AGC values. This is exactly the opposite of the stated objectives since it limits the event to only those stations willing to run excessive amounts of power.

On HF it might be acceptable for contesters to run high power levels while the non-participants can operate at lower levels in another part of the band with very little impact. This is not the case with AO-40. Only one AGC controls the receiver sensitivity for an entire uplink band. All it takes is one station running excessive power to make the entire band unworkable for the other stations that are attempting to observe proper operating guidelines.

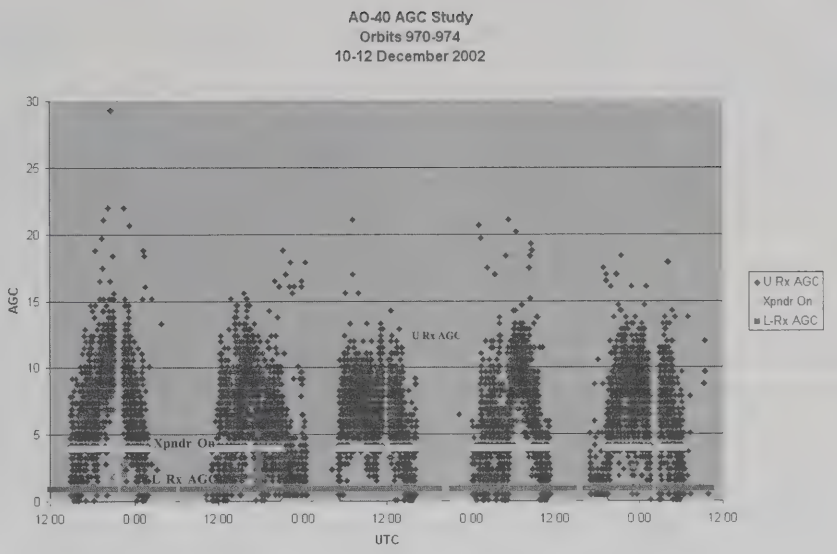

Figure 1: December 2002 Sample of Typical AO-40 AGC Levels

L1-Rx AGC

Looking at the L1-Rx AGC data (Figure 4) for the duration of the QSO Party reveals several extremely interesting patterns.

First and most notable is that for two full orbits there was no AGC activity at all. Second, the periods when there is AGC activity are always clustered around apogee when the squint angles are lowest. This also has some interesting correlation with the S2-Tx ALC that we'll be looking at in the next section.

Going back and running the tracking program through the five-orbit period it appears that the stations driving the L1-Rx AGC were located in Central or Western Europe. On each orbit that has apogee within view of Europe the AGC is active. During the two orbits without L1-Rx AGC activity the period of low squints around apogee is not in view of Central/West Europe. Whether this pattern holds true for long periods outside the QSO Party is a subject for future analysis.

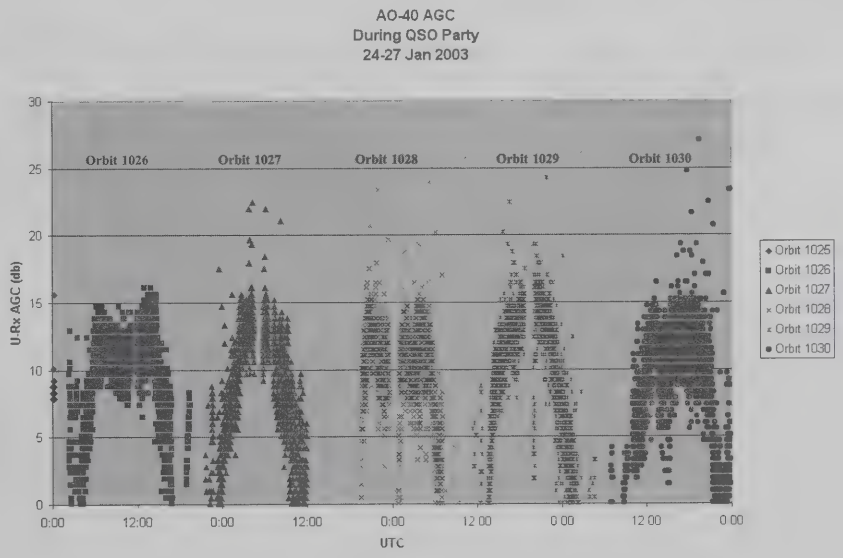

Figure 2: Measured AO-40 AGC Levels During the QSO Party

S2-Tx ALC

The S2-Tx ALC is used to prevent the S2 transmitter from being overdriven. Because it has the effect of lowering the gain of the transmit stage, signals which are strong enough to activate the ALC will have a detrimental impact on not only the other stations sharing the uplink passband with them but on all the active uplinks as well as the telemetry beacon.

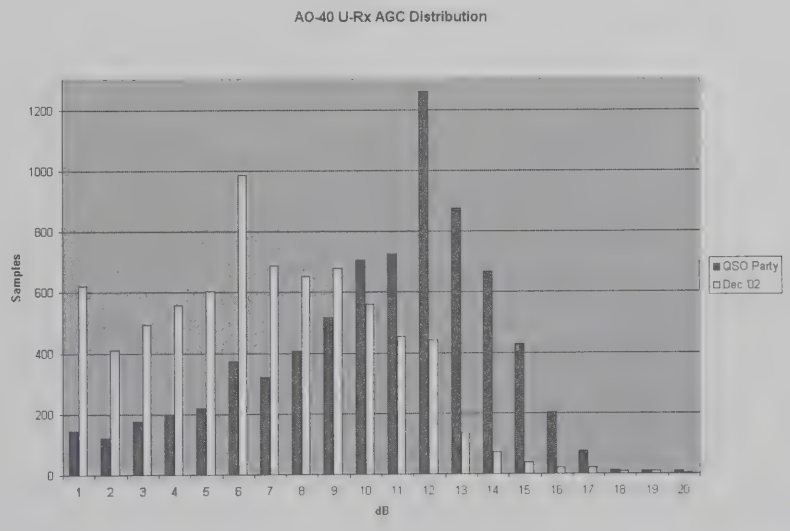

Figure 3: Distribution Histogram Comparing AGC Levels Before and During the QSO Party

The telemetry measurement for the S2-Tx ALC (#139) was never calibrated to represent any specific value or unit as indicated by the "Use Raw" comment in the AO-40 telemetry format specification. For the purpose of these charts I've chosen to display the number relative to a baseline value of "76" without any further scaling. See Figure 5.

The most notable thing is that the **L-band uplinks have a much greater impact** on the Tx ALC than U-band uplinks. In fact, there are several examples of periods when the U-Rx AGC is high; reaching values into the mid-twenty's without activating the ALC. However, almost all the ALC activity coincides with periods of L1-Rx AGC activation. The only exception is Orbit 1027. This one orbit shows some ALC activity which has no matching L1-Rx AGC activity. The curious thing is that the ALC activity is during a period of moderate (for the QSO Party) U-Rx AGC values.

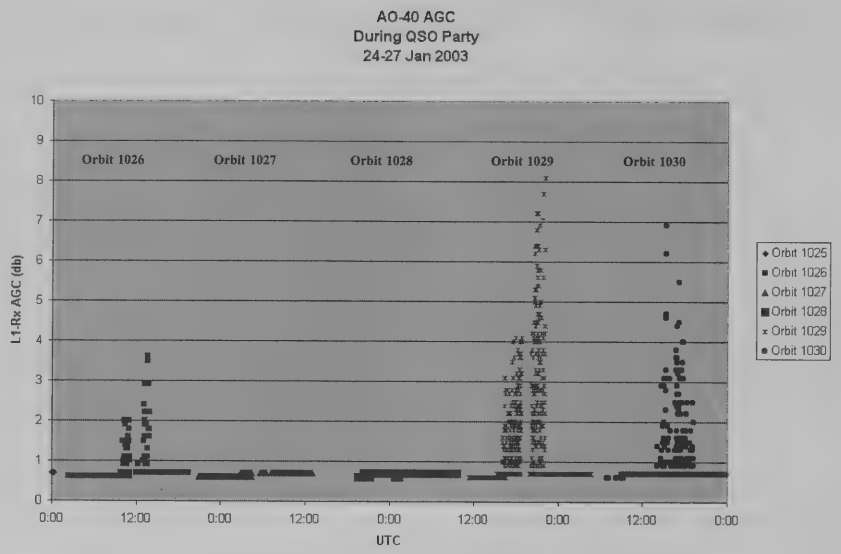

Figure 4: AO-40 L1-RX AGC During QSO Party

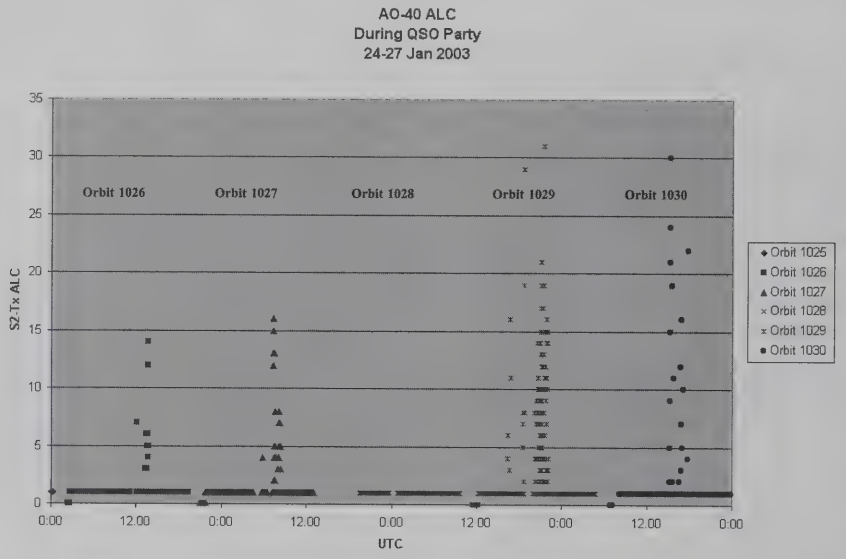

Figure 5: AO-40 ALC During QSO Party

Conclusions, Opinions and Suggestions

There has been a lot of discussion both on the AMSAT-BB email reflector and the #amsat IRC channel (accessible using the IRC command */server duck.informx.com*) about the merits of conducting a satellite based QSO Party. It is my hope that this analysis provides some factual background on which to continue the discussion about whether these types of events should be pursued in the future.

If the only objective was to get people on AO-40 then the QSO party was a success. Unfortunately, as the AGC/ALC data above shows, this event was disruptive to others on the satellite that chose not to participate. In addition I think that considerable negative training resulted and it will take even more time now to retrain people about proper uplink power management on AO-40. There are a few things I think that have some potential to help should the community decide to try again.

- Specify a maximum EIRP per uplink passband for participants.
- Specify a downlink sub-band to segregate the casual users from the special event. With 250 kHz available I see no reason not to designate a range such as 20 kHz below the beacon and down.
- Finalize and announce the operating rules far enough in advance to be published in the various AMSAT Journals around the world.

As a suggestion for a future event, I'd like to recommend a QRP day on AO-40. In this case I would define QRP as less than 100w EIRP. Prior to setting up such an event it would be essential to provide some explanation and training so that everyone understands and has a chance to properly compute their EIRP. Perhaps the exchange should be Tx Power output, system gain (antenna-feedline), EIRP. That would allow us to crosscheck each other and assist those that are still having difficulty calculating their EIRP.

If you have any questions or comments please feel free to contact me at ku4os@amsat.org.

Acknowledgements

- Stacy Mills, W4SM, for making the P3T telemetry program available.
- Paul Willmott, VP9MU, for running the AO-40 telemetry archive.
- All the stations out there which regularly copy and submit data to the archive.

■

It is time to submit nominations for AMSAT-NA Board of Directors.
AMSAT Member Societies or five current individual members may make nominations of fellow members to serve a two-year term. Four seats on the seven member board must be filled this year. Those whose terms are expiring are: Barry Baines, WD4ASW, Dick Daniels, W4PUJ, Robin Haighton, VE3FRH, Bill Tynan, W3XO. Please be sure that anyone you nominate understands that meeting attendance is necessary. Nominations should be sent to:
AMSAT, 850 Sligo Ave, #600, Silver Spring MD 20910
and must arrive no later than JUNE 15th.

AMSAT-NA Space Symposium Call for Papers

The 2003 AMSAT—NA Annual Symposium is scheduled for October 17 — 19, 2003 in Toronto, Ontario, Canada. This is the first call for papers to be presented at the 2003 Symposium.

Papers may be presented by the author during the Symposium or simply offered for inclusion in the Symposium Proceedings publication.

The subject matter should be of general interest to Amateur Radio operators involved in satellite communications. Suggested topics include: operating techniques, antenna design and construction, space-craft design and construction, current mission status, proposed satellite missions, telemetry acquisition and relay, etc.

A brief asbstract of the proposed paper should be submitted as soon as possible. The final date for abstracts is June 15, 2003. Copy ready papers must be received no later than August 15, 2003.

Electronic submittal is preferred in MS WORD format. Please e-mail your electronic submittals to Wayne Chandler at ve3whc@amsat.org ■

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20th Space Symposium and AMSAT Annual Meeting

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- So You Want to Build a Satellite! - Revisited
  by Dick Jansson WD4FAB
- AMSAT OSCAR-E Project Status Update - A New LEO Satellite from AMSAT-NA
  by Richard Hambly W2GPS
- How Kids Can Talk to Space People (who are aboard the International Space Station)
  by Gene Chapline K5YF
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Report of the AMSAT Board of Director's Meeting
Held November 10 and 11, 2002 in Fort Worth, Texas

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* Board Member # Alternate Board Member

Other AMSAT members participating and/or observing at various times included:

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David Bern W2LNX
Ken Chaffee WA1QXR
Barry Delong VA3BJD
Bdale Garbee KB0G
Jan King W3GEY
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Gerald Schmitt KK5YY
Dan Schultz N8FGV
Haruo Yoneda JA1ANG

The meeting was convened by Chairman Bill Tynan at 12:34 p.m. He welcomed the attendees and announced results of the September election for Board members. The incumbents, Keith Baker, Tom Clark and Bruce Paige were reelected with Rick Hambly and Steve Diggs to serve as alternates.

I. Election and Appointment of Officers

Haighton asked to speak before nominations for the various offices were offered. He noted that Baker had stepped forward last year to fill the vacancy of Executive Vice President, and had agreed to serve until a suitable replacement could be found. Haighton said that this replacement has now been found, and has agreed to serve. That person is Rick Hambly, W2GPS. Baker then nominated Hambly to be Executive VP. Tynan seconded. Haighton then announced that Keith Pugh would like to be replaced as VP, Operations, whereupon he had asked Stacey Mills to accept the nomination for that office. He said Mills has expressed interest but has not yet agreed to accept. He then nominated Stacey Mills to serve as VP, Operations, subject to his acceptance. Clark seconded. Nominations continued with Tynan nominating Haighton for President with a second by Baker. Haighton was reelected by a unanimous vote, with Haighton abstaining. Next, Hambly was elected Executive VP unanimously. It was decided to wait for concurrence by Mills before proceeding with the election for VP Operations. Tynan reminded everyone that the original intent of the office of VP Operations involved directing the team of satellite command stations. He noted that Mills has developed great expertise in this area. Haighton stated that his communications with Mills have included what the duties would be if he were to accept. He noted that it would be what Mills is already doing, with the additional burden of determining the budget for the Department. Clark added that things like the AMSAT HF nets have historically been included under this department. Tynan contended that this was a redefinition of the original intent and it happened to grow that way. Haighton announced that Pugh had agreed to continue in the Net role he has been handling over the past number of years. The Board was then referred to the Bylaws that state "The Vice President-Operations shall be responsible for managing the activities of such operations staff as the corporation may have, and shall have such other duties as the Board may determine."

The Chairman then called for a nomination for the office of Corporate Secretary. Clark nominated Martha Saragovitz. Haighton seconded, and Martha was elected by a unanimous vote. Art Feller was nominated for the office of Treasurer by Clark with Tynan seconding. Feller was reelected by a unanimous vote. For the position of Manager, Baker nominated Saragovitz with a second supplied by Haighton. Martha was reelected by a unanimous vote. Tynan was nominated for Board Chairman by Paige, with a second from Haighton. Tynan was reelected to continue as Chairman by unanimous vote with Tynan abstaining. Stan Wood was nominated by Paige to continue to serve as VP Engineering. Haighton seconded. Wood was elected by a unanimous vote.

II. Education

The Chairman called upon Jan King, Perry Klein and others to report on developments with regard to recent meetings with universities. King yielded the floor to Ray Soifer to describe what AMSAT has been doing with regard to university issues and the realm of the IARU. Soifer reported on efforts to establish frequency coordination among those universities expecting to use Amateur Radio spectrum for their satellites. He said the coordination system has begun to work, although it is not in full force yet. Hans van de Groenendaal continues to serve as the IARU Satellite Advisor and is responsible to the IARU Administrative Council for frequency coordination. There is presently a Committee of four advisors: Graham Shirville G3VZV, Norbert Notthoff DF5DP, Jan King W3GEY and Soifer. This group is to assist van de Groenendaal in this process. Eventually there will be a fifth person from IARU Region 3. Soifer said he would report more about this later at this meeting. At least one of these Committee members (King) is knowledgeable regarding university and educational satellites. The group has considered extensively what to do about CubeSats and other educational and experimental satellite missions which, although they meet the requirements for licensing by their national administrations, may not fit in with what most radio amateurs would currently find interesting - although, by virtue of their technology, may be relevant to Amateur Radio in the future. Soifer cited comments made by ARRL General Counsel, Chris Imlay, at the previous day's Space Symposium to the effect that the CubeSat and other university satellite programs are happening whether we want them to or not. What AMSAT needs to do is to get ahead of such programs and help shape them to the best of our ability. The Committee had proposed to designate two segments of the amateur satellite segments as Experimental and Educational Channels into which van de Groenendaal and the Committee would direct education and university satellites. The exact frequencies are not yet established, but the current proposal is for an approximately 100 kHz segment in the 70 cm band with a second sub-band in the 13 cm band.

King added that there are now nine such projects known to the Committee plus three more that have contacted other persons regarding their plans. In addition, there are several universities which are using amateur spectrum but have not contacted him, therefore he will contact them. Of the aforementioned nine, seven have provided information. Six are CubeSats and three are considered nanosats. Of the total known projects, four are in Region 3, four to six in Region 2 and the remainder are in Region 1. Thus they are quite widely distributed geographically. Daniels asked if the need for S Band transmitters might present a problem for universities which have heretofore been weakest in the RF area? He questioned the odds that a university, even with AMSAT's help, could come up with an S-band capable spacecraft. King replied that he is aware of a 2 W, 35% efficient, 1.125 inch square FM transmitter that can be purchased for $1500. Clark noted that King had avoided mentioning the 2m band where Bob Bruninga has advocated using 145.825 MHZ as a "Builder's Channel". Soifer stated that this has been considered. A discussion followed with Soifer suggesting that Bruninga be asked to contact King, van de Groenendaal or him, regarding his plans - some of which are understood to involve the ISS. This prompted an extended discussion regarding the use of 2m by university satellites. The general conclusion was that our attitude depended somewhat on what hams get out of the particular project. Clark put in a plea for projects such as Starshine's use of 2m. He also cited the DOVE experience. King noted another kind of 2m issue, namely universities wanting to use it for commanding.

Soifer noted that there will be grey areas and that it not the Committee's intent to adopt an inflexible position. Someone will have to make a value judgement about each project and that person is van de Groenendaal who will have the counsel of the Committee and it will be done on a project-by-project basis. He added that a very important issue is whether the particular satellite is to be open to reception by the general amateur population. He cited examples, coming mainly from outside the U.S., where an obscure form of telemetry, or modulation scheme, is proposed which may be technically interesting to university researchers, but is either not published or is proprietary to a commercial organization. Such would not be acceptable, he said. However, the development of technology that will be useful for future amateur satellites is considered a legitimate use of amateur spectrum.

Clark noted that we will see more and more of these short duration missions where access to 2m is desired. He said that is one reason Bruninga has suggested establishing a "Builder's Channel." He said he considered it a good idea. Soifer said that they will consider it, but noted that coordination

will be required so that some control can be maintained. King reminded the Board that he had predicted an exponential growth in the number of experimental projects and noted that we now have it.

Klein stated that there is an effort to formalize a joint program wherein AMSAT and ARRL will assist universities and others by mentoring, teaching Amateur Radio and frequency management techniques, so that we can meet our joint objectives of training new satellite engineers and producing spacecraft that hams can use. To do this, he indicated, we would provide RF and satellite design expertise to these university programs. We think we can identify these projects. He expressed the opinion that universities would welcome such assistance. The way we can get more ARRL cooperation, he said, is to have it bring more persons into Amateur Radio, e.g., by making it part of their *Big Project.* In the case of university students the League would provide adaptive training in the form of out-of-class lectures to motivate them to build satellites that can be used by hams. Things have progressed to where we have drafted ideas including action items for AMSAT and ARRL in a cooperative pilot project to try with a few universities. Klein added that it was impressive to see some results of the *Big Project* with kids building disposable antennas, sitting in on lectures and carrying HTs. But now we are talking about students at the higher, university level who are potential engineers and scientists for the space industry. He thought this might also be a potential source of funding and considered it noteworthy that ARRL has established a development office. Soifer added that he was impressed to learn from Imlay that the ARRL has hired Mary Hobart as Director of Development. He said she that has a long track record of getting grants, and has already obtained funding for emergency communications projects. He added that the ARRL Foundation may have seed money to get a program going. He suggested that one of the action items should be to see if to see if we can work with that office to find sources of funding for ARRL's and AMSAT's portions of the task. He reported that the group got together with ARRL representatives after the meeting, and drafted a short paper.

Klein then declared that the question now is what Board action will provide the authority to continue with this and to work with ARRL? He quoted from the second draft of the Committee's document that states AMSAT's role in this proposed joint AMSAT-ARRL program as "bringing Amateur Radio to university satellite projects". He added that the lack of coordination in some proposed projects that are outside of Amateur Radio, and wondered what steps AMSAT and ARRL can take to ensure such projects conform to the spirit of ham radio, while enabling the universities to accomplish their objectives of training people, while we hams also benefit. AMSAT's role in this joint program is defined as first, to provide formal classroom training in telecommunications and radio frequency management wherein AMSAT would assign qualified members to give lectures on these subjects. A second role for AMSAT would be to work cooperatively and constructively with the project teams toward planning the payloads that are compatible with the amateur satellite service and if they are not, suggesting how they might fit into other services. The highest priority would be given to projects that include a transponder or something that can be used by amateurs for both uplink and downlink activities.

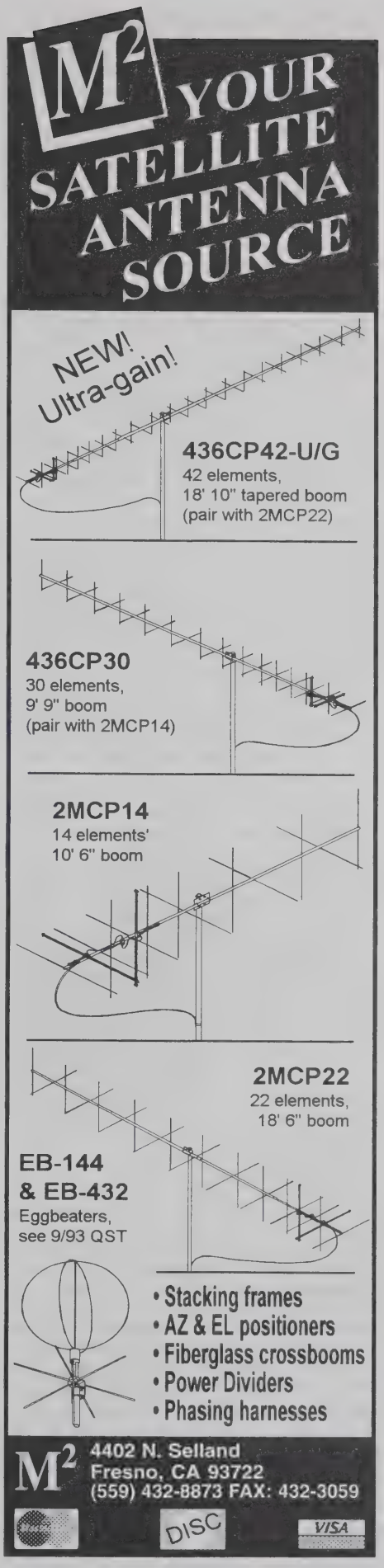
The third function is to assist university teams in determining the appropriateness of their experiment to use ham frequencies. In the worst case where they can't work amateur content into their project then to help them find how they can employ frequencies outside the amateur bands, e.g., in the Part 5 Experimental Service. Finally, to provide information on communications specifications, modulation techniques and other things that would make the project most compatible with amateur capabilities and standards. This is presently an area of weakness for them. Although they are likely to have persons on call for mechanical and thermal design, communications systems and RF techniques are not usually taught in schools currently. So we see AMSAT's contribution as providing mentors to actively work and follow through with these projects. The League will be asked to adapt their training program on how to become a ham radio operator to this program.

Tynan asked about the League's *Big Project.* Klein said he interpreted it as trying to integrate ham radio into high school or grade school science and geography units although not directly focused on students becoming hams, however there are also some training programs aimed in that direction. He stressed that it did not focus on the university level.

For an organized program to be established 1) ARRL and AMSAT would designate someone to organize the effort. 2) ARRL would help locate and assign volunteers to the particular projects, possibly involving local ARRL Affiliated radio clubs 3) ARRL would help identify and apply for funding grants. By identifying this as a pilot program and putting the emphasis on training by means of hands-on, high profile satellite projects it should inspire the next generation of engineers and scientists to seek careers in aerospace.

Tynan mentioned the relevance of the ARRL Foundation to this type of activity, to which Klein agreed that these proposals are highly relevant to their solicitation of donations for *The Big Project* and for the Defense of Frequencies effort.

Citing his experience as a professor at two universities and as a guest lecturer at many, King provided his thoughts on the background and concepts of the program. He provided information regarding what is taking place at these universities and why satellites are emerging. For example, it is typical that universities find that spacecraft engineering has become enough of a mainline pursuit that it can be taught in their aero- and astronautical curriculums, and no longer has to be a specialty. Furthermore, as Bob Twiggs has shown, a university can actually do a project in 1-2 years. He added that in the 1980s AMSAT may have been ahead of its time expecting that our Microsat design might serve as a model for university projects because they weren't quite ready for it. Now the goal is to fulfil the objective of improving fourth-year engineering students' hands-on experience by having them do a senior project. What the schools have done, he said, is meld into the project both a lecture and a laboratory components. In the lectures, students learn systems engineering, starting with design concepts and then phase into subsystems by giving 2-3 lectures on each subsystem throughout the semester. The relevance of this is that the obvious place where we can plug into it is RF engineering because by their own admission, that is one of the weakest skills in U.S. schools today. Thus, we can play to that weakness during the time when the telecommunication subsystem is presented. We



can come in and present lectures on those things we know best and are the universities' weakest points. We can also do more than that when it comes to implementation of RF systems, by covering such topics as component choice, transmitter design and construction, spacecraft antenna design and development of suitable ground station equipment. This will surly involve extracurricular activity because there is not enough time during the lab sessions to accomplish all that needs to be done. This provides another opportunity to interact with students and their professors at a less formal level. It is common that universities call on outside experts in such specialized areas and they frequently get such support from industry. In other word, they are already looking for mentors to cover subjects where they have a weakness. As mentors, our responsibilities would be to present the telecommunications lectures, provide hands-on laboratory support, provide guidance and assistance so they do the right thing when it comes to constructing the RF portion of their satellites, and obtaining proper radio licensing for the project. All the while, students are being exposed to Amateur Radio.

Mentors for the pilot program should have the following skills, 1) be very familiar with the amateur satellite program, 2) have good lecturing and teaching skills, 3) possess good practical hands-on lab skills and 4) be familiar with the radio regulations, both domestic and international. Tynan suggested that AMSAT's involvement with the MOST project is an example of a similar activity. King replied that in that case, we were trying to address the entire systems engineering job, while here we're focusing on only one to three areas. He added that if you include the telecommunications with data systems, universities often don't have familiarity with real-time operating systems. Although they are familiar with computers they aren't knowledgeable about radiation hardening of computer systems.

King reported that among the individuals who approached him regarding the mentoring project was Dr. Steve Horan AC5RI who is actively involved with a project named TriCornerSat at the University of New Mexico. It involves the use of Amateur Radio, government band and space research frequencies. This had required three different applications and they have successfully made it through that process. Another person who has expressed interest is Dave Filmer W9DF who is with Purdue University where they are in the early stages of a project. King said Tom Clark's name may be included with this group. Tynan suggested including Jim Akers W5VZF, who holds a PhD in electrical engineering and is retired from Mississippi State University. King said that what he wanted to do is to identify the characteristics of the individuals who might actually be doing the interfacing with the universities. He wondered how much work of this sort should one person be expected to do and suggested that although one person going to 2-4 schools per year might be considered too much, with a possible 40-50 universities involved. One person per university would require more people than are likely to be available. Klein reminded the group that our effort would start with a pilot project, after which the word should spread.

Clark suggested adding the design review process to the functions that should be performed. This process, he said, involves outside examiners coming in and subjecting the student's project to critical reviews. King agreed, saying that is consistent with procedures at the Air Force Academy and Purdue University. Tynan added that this was one of our functions during the MOST project. King replied that it is a common and necessary approach. He then asserted that younger people should be recruited into the AMSAT community of satellite builders and suggested recruiting at the best and brightest universities by offering them the opportunity to work on the larger and more sophisticated amateur spacecraft. There may also be a financial reward for AMSAT from this. Daniels opined that among the things AMSAT does best is to provide constructive criticism and we want to be seen as a useful adjunct to a university project by helping the schools prepare for a satisfactory review. King opined that most professors would agree that a critical appraisal of a student's work is a useful and helpful role, and that we can be of assistance in this area. Haighton said the first thing to do is to select a volunteer to head the program. King responded that the Board should first agree to establish such a program. Tynan agreed that it should be formalized. Soifer advised the group that, if Haighton is going to make a formal presentation to the League, he should be able to say that the AMSAT directors have endorsed our participation. King reminded the Board that, although this is education and probably belongs under AMSAT Education Department, the way we came to be involved was through the spectrum management issue - and that now it has gone back toward education. Tynan observed that we started earlier with the idea we were going to help colleges build satellites, and then along came an onslaught of 4 inch cubes being planned for launch, many of which do not belong in the ham bands.

Soifer explained that, since we don't have a volunteer to head this new program, it might be helpful, for the League presentation, for us to have passed an endorsement in principle of the program just described by Klein. Haighton moved that the AMSAT Board develop a proactive educational program at the university level in accordance with action items described in the meeting with ARRL held on November 9, 2002. Bruce Paige seconded. The motion passed by unanimous vote.

Haighton then asked for a volunteer to head the program who need not necessarily be a person to go to the universities. Klein said he could help with respect to developing this with ARRL. Clark cautioned that we don't yet know the details of the program to be developed, so we need to arrange to get together a small group of those having ideas or understanding of the problem. These persons might include Dave Filmer from New Mexico, Jan King, Jim Akers and Ron Parise. He then recommended forming a kick-off committee of 24 people. Tynan said the first thing to do is to talk to some of the persons who might be involved, although discussions have already been held with some of who have already been approached. David Newman offered to help, noting he had been a Professor of Electrical Engineering. He told how he had previously talked about documentation with some persons who wanted to do a satellite project. Thereupon, Haighton proposed that a committee be formed, originally comprised of Klein, King and Newman with others to be added later. Haighton said he would like to be kept informed since there is a possibility that he will be meeting with ARRL again.

Tynan called on Ken Chaffee to discuss educational issues in secondary schools. Chaffee reported that Haigton had asked him to prepare a position paper on how AMSAT could fulfill its educational mission in grades K-12, and he had agreed to do this. Citing the demands of other matters, he apologized for not having yet completed a written report but proceeded to verbally present his ideas. He reminded the Board that, at last October's Board meeting, he had commented on the plan to prepare a curriculum or lesson plan for K-12 that we might be able to sell to school systems. At that time his opinion was that this plan would probably not work out, and he is still of that opinion. Citing his past experience and present contacts in public education, he noted that the educational system in the U.S. is in a great state of flux with teachers being asked to perform many different non-educational duties. This adds to his belief that we cannot sell lesson plans to local school districts. This has led him to consider how AMSAT might fulfill its educational mission in grades K-12. He came up with the idea of establishing a group of volunteers similar to the Area Coordinators which might be called the Educational Resource Corps or School Resource Corps. This would be a group of individuals who would be willing to make themselves available to local teachers and school systems to help bring satellites, and especially Amateur Radio satellites, into schools. He noted that, at the Dayton Hamvention, he worked at the ARISS both with Jerry Hill who is the coordinator for the ARRL's *Big Project.* During that time they discussed the purposes of the ARISS project and how it has been used to encourage science teachers to have their students talk to the astronauts and cosmonauts in space. Chaffee learned that the program Hill is developing is for 20-25 pilot schools in the U.S. and that it includes supplying them with not only a curriculum, but also an amateur transceiver with accessories for the purpose of establishing ham clubs in middle schools. This is where they are focusing their attention. The curriculum also includes cellular telephone service using satellites, satellite data links and other applications in the commercial world. Chaffee opined that we have the expertise to at least talk about Amateur Radio satellites as part of this program. He observed that there may be a considerable overlap between the Area Coordinators and this proposed new group of volunteers.

Tynan asked about funding for the League's plan to provide amateur equipment to the schools. Chaffee said that the information coming from Hill stated that Mary Hobart's primary function at ARRL is to develop funding for the program and other related efforts. He added that this seems to represent a change from how the League has operated in the past; wherein they depended for income on the sale of publications, membership dues etc. Now they are trying to acquire funding from various other organizations, apparently with some success. Diggs said that the pilot school in the Atlanta area has already been supplied with a transceiver and accessories suitable for satellite work including a tower.

Chaffee said he is uncertain how to make his proposed resource known to teachers. Tynan offered the suggestion that this should be taken up with the League, because they know who the pilot schools are and the number of hams in the area, etc. So they can guide us and we can supply the appropriate people. He also expressed the opinion that the Field Operations people might be helpful here. Baines contested the idea of using Field Ops, opining that having a separate organization makes sense because the Field Ops, who are working with amateurs and ham clubs, may be reluctant to deal with students; and may not have the skills needed to do so. Rather, he thought it would be better if Chaffee had a team focused on education with the interest and motivation required. Haighton said this team could overlap in some cases with the Field Operations team. It was agreed that some persons might participate with

both teams. Tynan suggested that the list of Area Coordinators could at least provide a starting point. Haighton asked Chaffee if a written proposal could be assembled before January 1, 2003. His reply was that he could do this within a month or so. Chaffee added the personal comment that he has limited skill as an organizer of people so he would prefer not to head the group.

Clark noted that Steve Bible, the present VP for Educational Liaison, has had few contacts with K-12 and university educators. He added that, historically, education has been anything that had to do with talking to people outside the amateur ranks. This started at the kindergarten level and ran through to PhD programs. He contended that is trying to put too much in one department. Haighton said that he had recently received a resignation from Bible who explained that he now has too many other things demanding his attention. Haighton agreed with Clark that the education effort needs to be broken down into smaller components. Clark added that Chaffee's efforts to develop curricula for elementary schools and its application to the *Big Project* is not the same thing as mentoring at universities. There was general agreement about this. Haighton thanked Chaffee for his presentation. It was suggested that Chaffee's curricula might be turned into a Journal article.

III. Financial & 2003 Budget

Feller introduced a draft version of 2003 Budget based on numbers from the 2002 Budget as supplied by Saragovitz and Haighton. Tynan declared that it is clear that we have a financial problem and, before proceeding, explained that the policy has been to discuss each item as the various departments report. Near the end of the meeting, the information is consolidated, and then a vote taken on approval of the Budget.

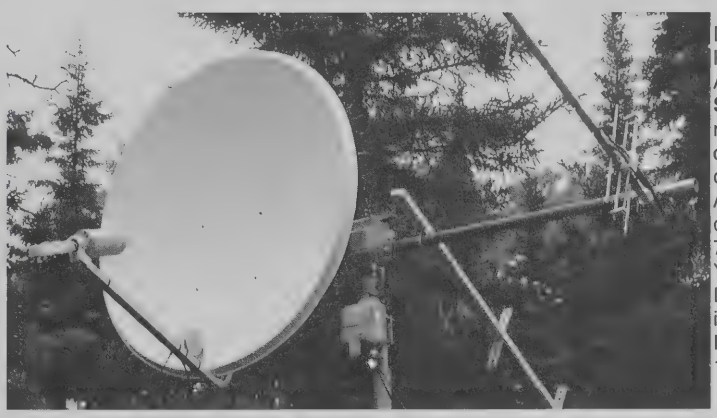
Haighton announced that he had met with Assistant to the President Barry Delong to review each item. By excluding the new projects, Echo and Eagle, they were able, by referring to trends of the past two years, to drastically reduce many of the projected expenses and come up with tight, realistic numbers.

Haighton asked Keith Baker to present the financial analysis he had prepared for years 1994 through 2001. Baker distributed copies of his report and described how the numbers were derived, and noted that he had done a similar sort of thing in past years. For this report, he deleted income and expenses for projects in order to learn what amounts came in and were spent to run the organization. He noted that income comes mainly from miscellaneous donations and membership dues, so these numbers can serve as an indicator of profit or loss from operations. In 1994, he said, AMSAT took in $117,000 more than we spent but this value has been declining since. In 1998, we spent $31,000 more than we took in. And after that, it has fluctuated between profit and loss. Overall, there has been a downward spiral. This, he said, may be partially due to a steadily declining membership. For example; in 1994, we had 7900 members. And by 2001, the number had dropped to 4591. This number includes Life Members, who may not be contributing financially. So, the loss has amounted to about 58%. While we have had income from projects such as MOST, we are spending a significant amount just to keep operational activities going. The raw data also show that, in recent years, the ARISS project has been costing AMSAT $30,000 to $40,000 per year although there has been some money coming in. In 2000, we spent $47,000 for ARISS and took in $1,300 in earmarked donations. In 1999 we spent $20,000 and took in $1,500. So here, Baker continued, we are funding a major project. He added that, in case of ARISS, there were also donations in-kind from other sources, but they don't go through our books. Clark noted that the $11,605 profit figure that Baker shows for 2001, is really a $35,000 loss, if MOST income is excluded. Baker agreed, noting that in 2001, there was a $1,230 expense for MOST, while we took in $47,000.

Baker concluded that the trend he sees in these figures is that, if you remove the effects of our projects, it is costing us more and more money to run the organization. And, we are not generating the revenue to do it. We are having to consume our reserves, just to run the organization. Saragovitz maintained that nothing has been taken from our reserves except for the Echo project. Haighton explained that, instead of our putting money into the reserves, we are using General Fund donated money for administrative purposes. Saragovitz declared that is what a General Fund is for, to help run the organization and donors have their choice of how to designate their contribution. Feller pointed out that, according to IRS rules, if a donation comes in with a use specified, we must use it for that, or return it. Clark commented, however, that, if the donor doesn't designate, it's AMSAT's choice of how to use it.

In response to a question, Saragovitz estimated that, of the 4591 members enrolled in 2001, approximately 1800 (about 40%) are Life Members. Baines reminded the Board that there are expenses associated with Life Members. Saragovitz countered that many of them make contributions. Furthermore, she said, only 50% of the Life Membership dues go into the Reserve Fund.

It was noted that, it was by design that the reserves will be used over time to support the Life Members. Clark added that it had been hoped that interest received from the reserves would cover these expenses. Paige asked how we determine if a member is deceased? Saragovitz answered that, often their mail is returned with a note from a relative. Tynan suggested periodically checking the list of Silent Keys appearing in *QST*. It was also mentioned that we have established several categories of Life Membership, including: a) those who have never responded to a mailing, b) those who have stated that they want to vote but not receive the *Journal* and c) regular Life Members who want, and receive, all privileges of membership. Saragovitz agreed that many Life Members are costing us, especially those who enrolled when a Life Membership was only $50 - and that we have been providing service for them for as long as 30 years. Haighton said he is concerned that this membership category is a major cost. Saragovitz countered that Haighton is not counting money received from Life Members from fund raising, trinket sales etc. Clark recalled that this kind of analysis was done 20 years ago and it was concluded that the dues a member sends in do not pay for all the services they receive. i.e., mailings, the *Journal*, Martha's salary plus the underlying perks of membership in the organization. And that's not counting the projects, because membership dues do not cover projects.



Dale Hershberger, KL7XJ, in Soldotna, Alaska, uses a **SatEL Az-*EL!*** to mount a 3' N3IYR circular polarization offset dish for his AO-40, 2.4 GHz downlink, and a M2 70 cm 11 element Yagi for his uplink. Dale is about to install a DEM RHCP helix for a 1.2 GHz uplink.

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It becomes worse, he said, when you add include Life Members, so there is nothing new here and we still don't have a solution.

Baker explained that he was merely trying to point out the negative trends we need to be aware of. Saragovitz added that the big trend is that we're not getting many new members, although the renewal rate has improved. Tynan said that we had been blaming this problem on P3D, but observed that there was a significant drop even in 1996 when AO-13 reentered. Membership has declined since then, he noted. Saragovitz reminded the Board that, prior to 1996, free software had been given to new members, and restated that we are no longer getting the new members we need to sustain the organization.

Tynan returned to the subject of ARISS. Baker noted that, for 2001, the total expense line shows $304,000. And of that, approximately $800 was for P3D, $31,000 for ARISS, $1,200 for MOST and the amount for new projects including Echo etc. was $23,000 Soifer asked if we have the history from 1994 to the present for ARISS? Bauer said that the ARISS budget has increased over the years, primarily due to travel. Tynan declared that, while no one is questioning the worth of the project, it is one of the major expenses. He said, the Board is merely examining the cost of everything. Baker suggested that we again approach the League regarding cost sharing on the ARISS Project. Hambly asked Bauer what percentage of the money for ARISS, from all sources, does AMSAT provide? Bauer replied that our share is very small compared to what NASA puts in. He said NASA is spending about $150,000 physical dollars, while AMSAT is contributing about $39,000 and ARRL about $15,000 to $20,000. Tynan asked if the ARRL contributes about the same as AMSAT for travel? Bauer replied that there are more people traveling on AMSAT's budget than the two supported by the League. McFadin declared that ARRL does a lot of things for ARISS for which we have no records. Clark asked if the portion NASA provides includes salaries? Bauer replied "no", not Carolyn Conley's, the astronauts or others. He explained that he was trying to give some visibility to the fact that we are underwriting ARISS to a significant degree and before we go jumping into other things we should realize that we are already involved with it. Clark maintained that, if you do cost accounting with the figures that Bauer has presented, they would add up to $500,000. So, with our $37,000 we're leveraging at ratio of 12 to one. Bauer related that when he reports to NASA and points out that if they consider our volunteer time, the Amateur Radio community is putting about $5,000,000 a year into the ARISS program. Clark said that's why this is a winning situation. Baker reasserted that his objective was not to say that we need to stop our ARISS participation, but rather to bring visibility to it, so our members will know what we're doing. Clark said that Chaffee's earlier comment makes it clear that we must make it apparent to our members that ARISS is doing great things, and that they should be proud of it - and that it deserves their support with additional financial contributions. He also pointed out that the ARISS project is another recruiting activity which we should exploit better. He opined that many persons are AMSAT members because of the SAREX school contacts, etc. Saragovitz questioned the significance of this as a source of new members, but admitted that may be partly our fault, because we haven't publicized our role in the program sufficiently. She emphasized that we need to do a better job in this regard. Soifer added that AMSAT ought to be receiving the credit we deserve in the Amateur Radio community for our ARISS role.

Returning to analysis of our finances, Soifer noted that another way to look at Baker's data is by examining income and expense independently. He stated income as follows: 1994 - $351,000, 1995 - $244,000, 1996 - $279,000, 1997 - $294,000 - 1998 - $193,000, 1999 - $208,000, 2000 - $232,000, 2001 - $254,000. However 1994 appears unusual with income of $351,000. Tynan observed that 1994 was the year that a generous donor offered to match donations. That alone resulted in a total of over $200,000 being raised in support of P3D. Looking at the expenses, Soifer continued, show 1994 - $234,000, 1995 - $286,000, 1996 - $261,000, 1997 - $234,000, 1998 - $224,000, 1999 - $191,000, 2000 - 252,000, 2001 - $240,000. Therefore, after eliminating 1994, the profit and loss were approximately balanced. However with Echo and Eagle, we will have a deficit. From this he concluded we need to ask the League for more money, and we need to receive more credit so we can raise funds on our own.

Bauer said that it is important to recognize that the ARISS team has made the information available to anyone to use as they see fit. It's noteworthy that ARRL has a paid person to seek publicity and that they have decided that ARISS is an important part of their agenda. He expressed the opinion that this Board has been skirting this issue and has now only begun to address it. So AMSAT must be the one to publicize our role. Haighton replied that is why we are doing a review of all our written communications. Although, ideally, we would like to have a full-time publicity expert, we cannot afford that. Tynan stated that, even if we do all we can to publicize what we do in our Journal, the readership is only about 5000 persons compared to QST's 150,000. So, unless it goes into a publication like QST, it "doesn't go anywhere".

Daniels reminded everyone that Bauer is highly involved in making the ARISS program go and that AMSAT has done poorly in the area of publicity, including the lack of notice given regarding several technical achievements that would greatly impress people, if they were handled by a publicity organization. We have not been successful in coming up with an individual or a small group of people whose primary job is to publicize AMSAT.

Haighton reminded the board that he has appointed Russ Tillman as Vice President for Promotion and that Russ will be reviewing AMSAT's total strategy with regard to getting better recognition for everything we do, including what goes into *The AMSAT Journal*, *QST*, *CQ-VHF*, other amateur press organs as well as our Web page. He noted that this job represents a significant challenge. He thought it good sign that Imlay came to our Annual Meeting on behalf of the League to tell us what a good job we are doing. Soifer paraphrased Imlay's statement at the Annual Meeting to the effect that AMSAT is a place where you can get a lot accomplished if you don't care who gets the credit. He declared that he doesn't care who among the members gets the credit as long as AMSAT does. Saragovitz asked if the recent survey form revealed anyone who might be suitable to assist Tillman?

IV. Human Spaceflight

VP for Human Spaceflight, Frank Bauer, distributed copies of his documents entitled, "Amateur Radio on the International Space Station (ARISS) — The First Operational Payload on the ISS" and "Amateur Radio on the International Space Station (ARISS) - The First Educational Outreach Program on the ISS". These, he said, were presented at the 53rd International Astronautical Congress, The World Space Congress - 2002, 10-19 October 2002 in Houston, Texas. Bauer stated that these papers will constitute the bulk of his report to the Board. Hardware development and operations are described therein and these topics were also covered the previous day at the AMSAT Annual Meeting. He explained that his group has been significantly challenged from an operations perspective. He remarked that the demands from the space agencies and the program have resulted in his volunteers being pushed too hard. He has been working to improve this, and it seems to be succeeding. One of the big things they're trying to do is enlarge the operations team to provide redundant support. He said that one individual recently burned out and had to have a break. Bauer said that Will Marchant and Tim Bosma have done some very intense work and should be commended. He added that staffing is one of his biggest challenges.

Daniels noted that the two Bauer's papers are noteworthy with regard to publicity. Bauer added that, in addition to these two, his NASA team had three papers published on GPS. He agreed that we must do more to publicize AMSAT's role. He stated that things are going as well as they can with so much on our plate. Haighton asked if the papers could be reprinted in *The AMSAT Journal*? Bauer replied that it is likely they can and that the subject has already been discussed with the *Journal* editor.

Tynan asked when the FT-100 transceiver will go up and become operational? Bauer replied that there are two pieces. One is the slow scan TV equipment. It is scheduled to go up by July. The Phase II hardware has a lot more to do with it. He didn't think he could guess when it might go up, except that it will not fly in February as hoped. McFadin added that the Phase II hardware requires that we agree on the exact configuration and actually come up with equipment built, adapted and certified for space flight.

McFadin noted the disperse attitudes regarding ARISS. The astronauts look at it as a tool they can use, NASA looks at it as a publicity/educational outreach tool. Hams look at it as an opportunity to make contacts with other hams in space. Tynan offered the opinion that, because it is not as generally available to hams as many had hoped, and that may explain why it is not being supported in terms of AMSAT membership and contributions. Nevertheless, he contended, it is valuable to Amateur Radio, and AMSAT. McFadin noted that one of the recent positive developments is that the packet station was put in operation.

Soifer observed that the use to which the equipment is put depends on the crew, and thus varies from crew to crew. Bauer reminded everyone that external payloads will be available eventually, offering opportunities for much more participation by ground-based hams. Haighton said that the December President's Letter will highlight the significance of the ARISS project. McFadin said that we have planned ahead in terms of the capabilities we have built into the system by putting on board such items as the S-band and L-band antennas. He explained that although not many AMSAT members know it, we are trying to do our part in saving amateur spectrum. The time will come, he concluded, when we have an S-band receiver up there. Baines stated that more informational material regarding ARISS is needed for the Area Coordinators. Baker said he would coordinate with Baines about preparing a DVD presentation.

Wood reminded the Board that the ARISS project is picking up of the costs of the Orlando lab. He

advised that, now that we are getting more into Eagle, it might be an appropriate time to reallocate these costs. Saragovitz noted that, the rent is $424 per month, and that another major cost is liability insurance. She said that Wood is negotiating with the underwriter in an attempt to reduce this. Haighton moved to accept Bauer's two IAC papers and report. Baines seconded and the motion passed unanimously.

V. ITAR

Tynan explained what ITAR (International Trafficking in Arms Regulations) is, and that it comes under the Department of State. ITAR defines procedures to be followed before information is exchanged with foreign nationals on a number of items, including all satellites and their components. He stressed that no exemption is made for amateur satellites. He said that penalties for violating these rules are substantial. Thus, ITAR has been a concern to AMSAT. He indicated that there is some hope that these regulations may be eased somewhat for certain kinds of satellites, including amateur, but nothing definite has been forthcoming so far.

VI. Eagle

Wood reported that an Eagle project meeting was held in September He commented that it was an excellent meeting at which all the systems were laid out. The need for a budget for the coming year was discussed. As a result, he and Lyle Johnson made a list of all the items needed to support the needed activity, e.g. IHU, sensors, antennas, batteries, solar cells etc. Haighton stated that the total amounted to $109,000. It was asked if this amount is necessary during the coming year merely to keep Eagle a viable project? Wood opined that the proposed budget cannot be reduced by more than 50% and still support the things which must be done to keep the project alive. He said that, if only $20,000 is available, only paperwork can be produced. With $30,000 to $40,000, prototyping hardware can be started. He noted that there would advantages in working in concert with the German P3E project because we can use some of the same equipment, for example the IHU, memory, solar cells and the battery charge regulator (BCR). As an example, space-ready 3.5V 12 A lithium ion cells can be purchased for $800 each or, alternatively, cells of unknown value requiring at least a year of testing may be available for $250. Wood noted that the German project has tight requirements for the BCR which will require some development. He stressed that we can't put the solar cells, batteries, BCRs or IHU on next year's budget because they must maintain a threshold level of development. Otherwise, Eagle will fail to be a viable project.

Tynan asked if most of the problem wasn't that if you're going to coordinate with our foreign compatriots, it is their schedule which is forcing our efforts, rather than our own? He noted that they are on a much tighter schedule than we are. Wood replied that, if we arrive at a position where the schedule must be accelerated, we would have a problem doing so. He added that it is mutually beneficial that we support each other, as there are many subsystem that can be common. So it is not a case of us sending them money, or them sending us money, it's a matter of splitting the costs of some of the development of these common subsystems.

Wood concluded his presentation, saying that the Eagle Budget can be reduced to less than $50,000 and still survive. But at $20,000, it's not likely to get done. Haighton reported that because contributions to the President's Club fund were solicited at the Annual Meeting, a generous grant was received from an anonymous donor. He said we also have two challenge grants outstanding for $1000 each that are specifically designated for Eagle's Earth sensors. Therefore, He contended, there is a potential source of $39,720 raised for Eagle over the weekend. Therefore, he moved that the Eagle project budget for 2003 be reduced from $101,000 to a maximum of $40,000. Discussion followed with Tynan suggesting $50,000. Haighton recommended keeping in mind that with VP, Engineering (Wood) watching over things, nothing will be spent which doesn't have to be.

Clark declared that, as a frequent devil's advocate, he wanted to ask two embarrassing and obvious questions. First, in the light of P3E plans by AMSAT-DL, why do we need to build Eagle? And second, assuming that Eagle is needed, if the developers of P3E and P5 are developing all the items we are going to need anyway, and we don't intend to add more *widgets*, why do we need to spend anything, when we can let them develop it and we just clone their pieces? Wood replied there are a few areas they are not working on. If the Germans launch a replacement for OSCAR 13, it will likely use the same class of solar cells used before. On the other hand if we can get 27% efficient cells, the amount of power available will almost double.

Following an extended discussion regarding the merits of various modes, and new technology vs old technology, Daniels commented that we have our technical team developing the IHU and associated equipment for Eagle, P3E and P5 (the next generation of satellites). What we could most productively do, he continued, because we're interested in RF, is to bring in new people who can develop transponders. Tynan opined that this argument becomes even more critical with a shorter time frame associated with Echo, because there is an immediate need.

Baines, referring to AMSAT's Vision Statement, said Eagle is to be the main project to develop our technical and management skills, so when last year we came up with the Echo opportunity and we saw that it had the advantage of an extremely short time to develop and launch; and there was a need to get something in space to help build enthusiasm, increase the membership base and get the organization going again after some regarded AO-40 as a failure. He added that he never regarded Echo as a replacement for Eagle with respect to technical development. Haighton asserted that there is a certain amount of cutting-edge technology in Echo as well. Baines agreed that it provides a valuable niche, but he doesn't see it as an either Echo or Eagle decision. Baker declared he sees it that way because of the financial situation. Haighton declared this is why we are looking at the numbers and reducing the budget to meet the financial situation. Tynan agreed with this, saying he believes Eagle to be a marvelous project but questions whether we have the financial resources to carry it out. Baker agreed pointing out that it is not merely a question of a budget for 2003, but a long term effort, eventually with the need to pay, possibly a significant sum, for a launch. He emphasized that we must look at the total project cost, not merely yearly increments. Tynan remarked that this might be the first spacecraft for which we didn't have a good assurance of a launch. Clark recalled that in the past we had some design studies underway, e.g., the Phase 4 geosynchronous satellite as well as some others and, at present, he viewed Eagle as being in the design study phase - not yet a hardware project. Haighton replied that some of the design effort requires prototype development. He added that this includes things we should be doing, which can be used on a number of projects. Nevertheless, Clark questioned whether Eagle, because of lack of defined launch and other considerations, is really a project. Baker countered that you can turn that around and ask how many opportunities have come along where a chance has arisen to get a launch at a good price, yet we had nothing to launch? He then asked Wood if he could operate with $50,000 and do real work and make progress. Wood replied that he can, but hoped that it would not be necessary to spend all of it. There are things he can do which do not cost a lot. One is to build a mockup to do antenna testing. Another is the BCR. And, McFadin, he said, has ideas regarding appropriate power supplies. There are several items to consider in addition to those, Wood continued, such as sensors, attitude control, propulsion and ground support equipment. Clark asked about plans to foster RF development? Wood replied that this is already underway. Wood opined that these are the things to concentrate on, and postpone others, e.g., the IHU. Saragovitz noted, however, that some of our volunteers are already involved developing the IHU in support of P3E and P5.

Referring to Baker's financial analysis, Soifer noted that the projected deficit is $391,000 and if that runs for two years then "we're out of business". He quoted Clark as having stated that "organizations like ours are supposed to run deficits". Then he added that of this amount Eagle's contribution to the shortfall is $101,000, 26% of the total, but now that amount will be cut in half. We are committed to our contribution to the ARISS project budgeted at $36,000, 8% of the total deficit, unless we can get the League to help with this. Another project we're committed to is Echo and it amounts two-thirds of the deficit. Soifer concluded that, if the Board wants to deal with the deficit, the biggest place to make a change is with Echo. Haighton reminded the Board that the figures for Echo are actually the amounts to achieve completion, including launch. Daniels pointed out that if we are unable to get a launch for Echo in 2003, its cost will move to a future year. Feller suggested that Wood and he look at the Budget so that a better estimate of costs can be made. Informal discussion of budget matters continued while recalculations were being made by Feller and Wood.

Wood and Feller returned after examining the Budget and reported that there are only two significant items to consider, parts procurement and travel. They were able to pare these by 50%, so the total amount needed in 2003 will be $39,000.

VII. Echo

Daniels presented a status report stating that we are in excellent shape with hardware being delivered. Mark Kanawati and Dino Lorenzini of SpaceQuest are working on Echo along with two other spacecraft that are expected to be launched by the end of 2003. All the solar cells have been purchased and the schedule calls for testing Echo early in 2003. We have a TSFR module and, based on recent developments, will get something useful to go into it. Due to the use of higher efficiency solar cells, more power is available than conceived possible at the time of the microsats. The consensus is that there may be a launch opportunity by the end of 2003 with a cost to us in the order of $150,000 to $250,000. A problem is that if we find a launch by the end of the year a $50,000 down payment will be due. The money due SpaceQuest becomes payable when they reach their final milestone. At that time, we must pay for all work accomplished. Our contract provides for a viable spacecraft and their current estimate

for that is expected around February. We should get the bill for another $50,000 by the end of 2002. One thing we must work on, he said, is an extended command capability. Saragovitz asked if there is another organization, such as AMRAD, which might want to use the TSFR module? No response was forthcoming to her question. Hambly summarized the status of possible payloads. He said there appears to be a potential experimental module small enough to be included and, if that if it comes to fruition, will be an interesting science experiment having to do with measuring drag in space. He also said that it may help provide some funding. There has also been a possible transponder payload, if it can be fitted in. Tynan asked about the current thinking with regard to ADCARS (Advanced Data Communication for the Amateur Service). Hambly replied that it wasn't much different than that expressed earlier in the year. He said consideration is being given to including a linear L/S transponder which might also function in a limiting mode. This could possibly serve to support ground-based ADCARS experiments.

Saragovitz asked how realistic is it that these experimental projects will be built in time? Hambly said he has had difficulty getting a volunteer to do the design and construction, so we'd like to join forces with the Eagle team and begin to assemble some RF hardware based on the Eagle concept of Mode L/S with some minor modifications. Wood asked when this package must be delivered? Hambly replied it depends on the launch date, but that we would probably need it in 6 to 8 months. Tynan observed that if the launch is in November 2003, it will be necessary to deliver the satellite at least 2 months before that, and this does not include a minimum of 2 months for testing. Therefore, he concluded, the RF package will be needed about he same time the rest of the satellite is complete - February 2003.

Baker asked about the planned orbit? Hambly replied it was low with an inclination similar to SO-41.

Wood noted that there are other opportunities for financial gain if we are willing to fly some university experiments, for example, he said he knows of a cosmic ray experiment to sample particles from the Sun. He remarked that this science experiment was originally planned for a high Earth orbit, but that there are persons who want to fly it but do not want to build a their own spacecraft to do so. So, Echo might be what they are looking for. He said that the sponsor is willing to pay a minimal amount to have the experiment carried, plus a significant amount to have the data collected. Soifer asked if they can provide a frequency outside of the Amateur Service for collecting the data. Wood did not know but said that the data would be directly related to ham radio. Tynan opined that the nature of the data is probably OK, but receiving payment for operating our transmitter would not be.

Hambly commented that Echo transmitters and receivers were originally to be crystal controlled, fixed frequency units, but are now synthesized and will handle approximately a 20 MHz spread. However, Wood said this spread would not be adequate to stretch the frequency to operate in the experimental service. Hambly added the receivers are now multifrequency plus there is a scanning receiver on board.

Tynan declared that the Echo budget is now cast in stone. Clark asked if it reflects reasonable integration and launch costs? Daniels declared that it is correct, leaving some margin for error and that it assumes a launch by the end of 2003 having a cost of $100,000 to $150,000. Hambly advised that the line item for travel might be optimistic.

VIII. Publicity

Vice President for Publicity, Russ Tillman, proposed ways to improve AMSAT's exposure. Noting that the need for finances had dominated the day's proceedings, he offered some realities dealing with reduced contributions due to a declining membership, the aftermath of 9-11 and changes in the economy since that event. He observed that we have a "publish what we get and when we get it" information system. In other words "we're trying to run a mule in the Kentucky Derby". With the various sources of information we have available we can develop a consensus of how to do things better. Specifically, we must do a better job of getting timely information to our members, which will hopefully translate into more income. In other words, we have not been maximizing our effort. So the objective is to get more with less. How do we revise AMSAT's communication, both in terms of external and internal discrimination to support better delivery of project information, whether it is through our traditional sources such as amsat.bb., *The AMSAT Journal*, our other publications such as the Area Coordinator's contacts, or our Business Development Committee etc.? From an external point of view, he continued, we need to improve dissemination of information to the other AMSAT organizations as well as non-amateur groups. If we can do this, he contended, some of the outcome may result in increased financial support and better understanding of our projects.

Tillman announced that he had been working with the Eagle design people and trying to serve as a "communications officer" with the idea of developing a model that we can pattern for handling information on all of our projects. His game plan is to try and capture the *who, what and why* of all the good things we are doing, but avoid the politics. He admitted it is sometimes like walking a tightrope. He recommended that we have someone shadow the design team who are already too busy, and prefer not to have to write reports. Tillman continued saying his other proposal is to meet with those handling our various communication media to try and fine-tune the distribution of information. He added that he is drafting a communication plan for the Eagle project and is making good progress. He intends to hold a Communications Coordination Meeting to identify recommendations to be sent to the President to pass on to the Board.

Haighton commented that, in the past, working as individuals, our overall communications effort has been uncoordinated and although each individual has tried to do his best and has done some good work, as an organization our communications have been dismal. He appealed to all to give Tillman full cooperation with what he's trying to do because all modern and successful organizations have very good communications. He noted that in the case of our ARISS involvement, the message is not getting out. He expressed the hope that Tillman can help focus on getting out our important message. Tynan asked about the advantage of generating a video chronicling the design and construction of Eagle. Tillman replied that he had not considered this but would think about it.

Baines asked how can we translate this communications effort into generating support for our various project? Tillman replied his perception was this effort would complement the work of the Business Development group. Tynan declared that we need fundraising tools, and hoped that this can be used as one.

IX. AO-40 Status Report

Stan Wood announced that AO-40 has experienced no important failures in the recent past, although there have been a few reports of a weaker signal from the 24 GHz transmitter. However, nothing has been reported by the command stations regarding this. He summarized the functioning communications subsystems as the 70 cm receiver, both 23 cm receivers, the S2 transmitter and the 24 GHz transmitter. In addition, a substantial amount of valuable data has been received via RUDAK.

Tynan asked Haighton if the user community is getting enough information as to what and why is going on, e.g., why AO-40 is in RUDAK at various times, and if there is anything we can do about providing more and better information? Haighton replied that Stacey Mills has been periodically putting out bulletins regarding impending changes in operating schedule resulting in a greatly improved situation. Clark agreed, saying that Mills had been posting information on amsat.bb in a user friendly format and has been answering questions. It was also noted that information appears regularly on amsat.bb and weekly on ANS and that information can generally be found quickly on-line. Tynan declared that, because Mills is being plagued by questions and comments, it might be worthwhile to have another person serve as an intermediary between him and the user community. Clark opined that it would useful to have someone generate a list of Frequently Asked Questions on this topic, reducing Mill's load. With regard to posting AO-40 information on the Web site, Williamson explained that such data usually comes from the AMSAT-DL site and our site links to it. He said that the best way to get the latest from Stacey Mills is to go to the amsat.bb archives, pull up the author index and look under "S" for Stacey. Paige asked if this information could be put on the Web page under AO-40? Tynan stated that that is why he had suggested having another person to interface with the users. Haighton announced that there already is an interface person (Jerry Brown) and that the function is working. It has been functioning for some time and is part of ANS Satellite Report. Tynan expressed pleasure at hearing this.

Haighton announced that had spoken with Mills by phone and was pleased to report that Stacey would accept the position of Vice President Operations. He said that now that Mills has agreed to accept the post, he nominated him to that office. Baker seconded, and Mills was elected by unanimous vote.

X. Electronic Publications

VP Electronic Publications, Paul Williamson, stated that little had changed with regard to the level of on-line activity except for an increase in the spam problem, although many of these messages going through amsat-bb are being blocked. However, there has been no attempt to filter the alias service. He said that may have to change, because complaints have been received about spam and viruses getting through. He did not consider it feasible to filter that because the filtering service needs to configured by the user. They have the option of filtering by their own ISP. Haighton depicted Williamson's position as being "if he doesn't filter enough he gets complaints and if he filters more he also gets complaints". So from that viewpoint, it's a no-win situation. He added that, in his opinion, Williamson is filtering about the right amount. Williamson noted that he has received a few complaints that he shouldn't be forwarding spam and asking that their alias be

canceled. He said he responds with a helpful message telling how to cancel. He continued, reporting that the mail alias service is now much more automatic and that some changes to make it more friendly have been implemented based on input from users. He estimated the usage level to be about the same as it previously was, about 14,500 mail aliases. He also noted that it is very diverse, internationally.

Questions followed regarding asking for payment from users of these services. Paige proposed making amsat.org aliases available only to members as the ARRL does. Williamson explained the League has several mechanisms in place that we don't have, such as integration between their Web site and their membership database. Although it would be possible for us to do this, he said, it would not be worth the effort. He reminded everyone that, years ago, Clark had made the point that having amsat.org puts us in the public eye. He contended that we get more than our money's worth in public relations value compared to any financial gain we might receive, so he didn't think Paige's suggestion was worth pursuing. The suggestion was made that we send non-members who are getting free service a yearly invitation to join AMSAT. Williamson replied that this could be done but, he has been reluctant to spam them in this way. Williamson explained there is only a slight relationship between the 1200 people using amsat.bb and the 14,500 aliases, many of who have nothing to do with AMSAT.

Wood commented that he had overheard a group of boater hams raving that the best group to join is amsat.org for its aliases and its Web site. It was commented that it's well known in the amateur community that if you get an alias at amsat.org, it will function well in comparison to many others. Williamson added that many people periodically change their mailing addresses to try to escape spam, and that this is another reason to have an alias.

Saragovitz requested, as she has in the past, that the AMSAT office postal address be made more prominent on the Web page and Wood agreed that it is hard to find.

Haighton announced that he has asked Tillman to include the Web page in his task of improving communications, and had also talked to Williamson regarding this. So, he suggested that we wait to see what they come up with, before making comments on the present design and content. Williamson asserted that the problem that needs to be fixed is generation of the content. Baker noted that the depth of the Web site is huge, it contains good stuff and no matter how you try to cut and organize it, there will be some group that thinks their area of interest doesn't have enough prominence. Clark raised the issue of the need for a search engine because there is so much there it's hard to find to find. Haighton praised the present "AMSAT A-Z" feature as a big improvement. Hambly suggested going to google.com and conditioning it to search on our site. Although several agreed this was a good idea and a way to eliminate our need for a search engine, Williamson pointed out there are requirements for doing this, and that their terms likely include an obligation to put Google ads on our Web site. It was agreed we cannot do this because it violates the conditions of UCSD where our server is located. Williamson noted that they do not charge AMSAT for this service, and that the bandwidth is incredible. we get free backup. He stated that a search engine is something he has wanted to do for a long time and has been looking at the available software, some of which is greatly overpriced. Klein noted that we previously supplied background material about AMSAT in our FCC filings, but now refer them to our Web site. Williamson noted that the last two years of AMSAT's FCC filings are now on the site. Clark asked Williamson if more hardware is needed and if Williamson requires assistance, since it had been mentioned that more material is needed? Williamson replied that what he needs is content providers, those who will adopt a specific area, such as was done for the AO-40 page.

Haighton speculated that the Radio Amateurs of Canada (RAC), which is presently providing ARISS Web page content, may come to us and ask that we take it over. He said he had volunteered AMSAT to do the hosting if it becomes necessary. Williamson declared posting is easy, but that there is also webmaster work to be done.

Williamson continued his report saying that the equipment now in place is more efficient and has a massive amount of disc space. Paige asked if the speed of the processor determines the speed of a message being posted to the amsat.bb list. Williamson stated the speed is more of a network issue and that the architecture of the mail program. Paige then asked about the cost of a bulk mailer if it could speed up delivery. Williamson replied it would probably cost us our Web posting because our host would not want us to intermail.

Williamson said another issue he wanted to raise regards confusion between amsat.org and amsat-na.com. He contended that anything that is even remotely publicly related (non-commercial) ought to be on amsat.org and that we shouldn't be publishing both addresses together. He advised that amsat-na.com should be used for certain other purposes which, because of their commercial nature, are not appropriate for amsat.org. It was pointed out that the League has the same situation with their arrl.net vs. arrl.org and few persons seem to keep that straight. Baker expressed the thought that some of the press release material might be moved from amsat.org to amsat-na.com.

XI. International and IARU

Ray Soifer stated that he had previously covered many of the recent international happenings, mainly those relating to frequency coordination, when the board discussed King's and Bauer's reports, plus the background information document that required the time and work of several persons. Soifer explained they are updating, but not revising, the document to reflect the new frequency coordination process as well as accommodating whatever changes have taken place in the outside world. He and Feller are presently finishing the document and will send it to the IARU Frequency Coordinator, Hans van de Groenendaal. It should be available to the public as soon as the Coordinator approves it. Feller reported that, after a study of the radio regulations, it was found that, if we want to launch a satellite, we don't have to go through a formal notification process, but rather Article 25 states that all administrations have to do is inform the ITU Radio Regulations Bureau. This has implications for the petition we intend to file wherein we ask FCC for the elimination of the current 27 month notification requirement. So, he contended, we do not have to "notify" at all, we have to "inform" - and the requirement in Section 25 contains no time requirements. This will be discussed with ARRL Legal Council Imlay.

Soifer remarked that this isn't the best week to give his report because the IARU Region I Conference is just beginning in San Marino, Italy. Graham Shirville, G3VZV, the AMSAT Frequency

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Coordinator for IARU Region I, is representing AMSAT and the satellite service at that meeting. As soon as Shirville joined the Frequency Coordination Panel he was invited to join the Region I C5 Committee which is their VHF/UHF committee, so this is probably the first time a real satellite person has been on that committee. That's a major step forward considering some of the experiences we've had with them concerning frequencies for SAREX. Soifer reported that, van de Groenendaal will not be at the San Marino meeting because of another commitment.

Soifer next reported that, at the IARU Satellite Forum held at the University of Surrey, the three main subjects were Frequency Coordination, CubeSats and other university projects as well as various items related to WRC-03 preparations. The next IARU Satellite Forum will be held in 2003 at the AMSAT Space Symposium in Toronto, Canada. He said that van de Groenendaal intends to attend. Soifer announced that AMSAT International, the e-mail distribution list for AMSAT organizations worldwide, is functioning well thanks to Williamson's efforts. Klein had mentioned earlier that AMSAT International membership had approved a proposal to allow the inclusion of attachments to their e-mailing because the convenience outweighs the possibility of transmitting viruses among the members of this tightly controlled list.

Soifer's remaining item concerned the budget for his department. He declared that the total amount is satisfactory, but suggested moving $100-$200 from the Travel allotment to the Telephone account so more teleconferencing can be done concerning frequency coordination matters. He added that travel is a function of the year and the amount is adequate for 2003, but more will be needed in 2004 to cover attendance at the Region 2 conference in Trinidad. He noted that there will be a Region 3 conference in 2003 and expressed the hope that Terry Carrell, ZL3QL, will be able to attend and participate, as he is a knowledgeable AMSAT person resident in that region.

XII. Field Operations 2002 Accomplishments

VP Field Operations, Barry Baines, distributed copies of his report. It is outlined below.

A. Field Organization activities included:

1. Representing AMSAT at hamfests

2. Conducting local area nets

3. Making presentations at hamfests

4. Serving as Elmers for newcomers

5. Encouraging satellite activities at schools, hospitals and Field Day. The good work of Dr. Jim Huhta AA4MD at his hospital in Tampa, FL was cited as an example.

B. The number of Area Coordinators in the US and Canada increased from 189 to 192. There are also 5 Country Representatives located in nations that do not have their own AMSAT organizations.

1. The list of Field Ops is published each year in the March/April issue of *The AMSAT Journal*.

2. Martha Saragovitz has the latest list available for distribution to new members and the list is available on the AMSAT Web page.

3. Inquiries are answered from individuals wanting more information.

C. For the period November 1, 2001 through October 30, 2002, Area Coordinators represented AMSAT at 39 hamfests in the US and Canada. These hamfests ranged in size from swap meets to major shows.

1. Total donations received from these activities for memberships, books, software and trinkets totaled $18,114, down from $21,796 collected over a 12 month period in 2000. Totals do not include receipts at the Dayton Hamvention.

2. AMSAT's notable successes at hamfests included the ARRL New England Convention in Massachusetts and at Pacificon in California.

3. There is a need in the coming year for more representation at hamfests.

D. AMSAT's printed materials revised in 2002 include

1. *Working the Easy Sats* updated by Mike Seguin N1JEZ

2. *The AMSAT-NA Digital Satellite Guide* updated by Gould Smith WA4SXM

3. *The Amateur Satellite Resource Guide* updated by Mike Seguin N1JEZ

4. The *Amateur Satellite Frequency Guide* updated by Mike Seguin N1JEZ with assistance from Bill Tynan W3XO and Barry Baines WD4ASW

5. The *AO-40 Analog Frequency Chart and ARISS Frequency List* was updated by Barry Baines WD4ASW with assistance from Ed Krome K9EK

E. Activities planned for the future include

1. Creating wider participation at hamfests and making our presence known by announcements on the Web page etc.

2. Encouraging Area Coordinators to make presentations using tools that have been provided

3. Providing an updated *Area Coordinator's Toolkit* CD-ROM in early 2003

4. Recruiting more volunteers to enhance the Field Ops organization, including those to coordinate hamfests, perform day-to-day activities including the *Field OpsBroadcast* and developing local nets/ Internet access in a manner similar to the Houston AMSAT Net.

5. Jim Stafford, WB4GCS will continue to serve as the AC webmaster, including updating the list of Area Coordinators.

Baines mentioned that several new volunteers stepped forward at the Annual Meeting to offer help with certain projects.

Haighton commented that Board members are highly respected among the amateur community and that their presence at a hamfest booth will enhance interest among those stopping by. He added this is very beneficial to AMSAT public relations and the Board member attending generally receives a generous welcome at any hamfest they visit. He mentioned again that each Board member should have an assistant to help fill in when needed.

Saragovitz noted that new AMSAT banners for use at hamfests should be purchased because the old ones are wearing out and this expense should be added to the Field Ops budget. Baines asked that credit card vouchers (charge forms) be sent with the materials sent for use at hamfests. Baines reported he had consulted with Saragovitz about the budget and they had made some cuts and added the cost for a revised *Area Coordinator's Toolkit* CD-ROM. He added the previous *Toolkit* had been well received and is making a difference. He asked for contributions of material for the new *Toolkit* including photos, WAV files and *PowerPoint* presentations.

The meeting was adjourned for the day by the Chairman at 10:00 p.m. It will reconvene at 8:00 a.m. the following morning.

XIII. Employee Performance and Compensation etc.

A closed session was held to deal with administrative matters including Saragovitz's performance review and compensation. While no record was made of this session, it was moved and seconded that she receive an increase in salary. This action was approved by the Board.

After the closed session the meeting was reopened and called to order at 9:05 a.m. Clark offered a resolution acknowledging the contributions of, and recognizing with thanks his help over many years, of former Board member Junior Torres de Castro who was reported to be ill. Tynan seconded, and the resolution passed by a unanimous vote. Clark agreed to send the text of the resolution.

XIV. Review of AMSAT's Strategic Plan

Haighton reminded the Board that Item 1 of the Strategic Objectives that lists the Milestones called for supporting development of two cutting edge satellites in the next 5 years, and that is what we are doing. He asked to hear from persons named in the plan concerning progress associated with objectives. One of these objectives is to establish policies and to team with universities in the development of small satellites. This task had been assigned to Clark and Steve Bible. He opined that it is progressing although taking longer than expected. Clark said that they have identified the problems, one related to the use of appropriate frequencies and the other the concept of mentoring while trying to get these groups into the ham radio family. Other things included the actions they've been able to get into the IARU structure and the recruiting of King to be the proper interface person to the universities. Tynan declared that the meetings held over the present weekend in an effort to bring the ARRL into this program are important and seem to be making progress. Haighton noted that the persons involved with this are Clark, King, Soifer and Haighton. Diggs commented that he has been communicating with Bible and asking for his advice regarding the year-long effort to open a channel of communication with Georgia Tech. The result of this is that Diggs wants to express to the Board that no natural alliance is seen existing between Amateur Radio and universities per se, although that is not to say there isn't a potential for this with the students. He feels that universities are looking principally for funding sources. So, when we walk in and try to convince them that AMSAT is a natural partner, it is as if we are foreign to them and their purpose. He continued, we should keep in mind that what is of value to us are future aerospace engineers. The aerospace engineering departments need us for only one thing, our RF spectrum. They are not interested in anything other than that. Diggs then suggested that anyone having experience which runs contrary to that viewpoint, should make it known. He added what he just described has been a consistent experience among those who have approached the Georgia Tech administration. Thus, until a successful way of interfacing with administration and faculty is found, these hams are now focusing on the students, not the university per se. Tynan agreed that this has been a problem, but observed that our MOST experience is one notable exception. He emphasized that, in order to be accepted, the AMSAT people involved must have credentials in the academic community. He noted that several such people were identified at the just completed Space Symposium. Hambly stated that, in the past when he wanted to get the attention of his university, he found it valuable to volunteer to give a lecture at a colloquium, as do industry representatives who have information to impart to students and professors. He opined that

it is an effective way to present your case and that you may be establishing productive relationships. It works well and all it takes to make a presentation at a university is to achieve an appropriate academically professional demeanor and avoid sales pitches. Thus, we can give one of our high tech presentations about subjects we know best.

Baker suggested recognizing that there may be money available at some universities for the activity suggested and cited King's experience of offering to share our knowledge and expertise. Commenting on Tynan's statement concerning MOST, Clark called attention to the successful involvement of our members with the joint venture with UNAM in Mexico City where Jim White and Harold Price spent time presenting concepts. Our experience at Weber State University was cited as another example.

Clark cited two objectives in contacting a university. One is to get their young people into Amateur Radio. The other is to build satellites hams can use. These, he said, may be inconsistent with what the universities want because they often want us to build their satellites for them. Most important, they want to use amateur frequencies to obtain data. These inconsistences most be resolved if we are to succeed in our objective. In other words, "how do we get University X to turn their CubeSat into an Amateur Radio program, not how could Amateur Radio contribute to their Cubesat program." He added that's a very important philosophy and it's why he liked the concept that emerged at that meeting of providing mentors for university programs, because that's our best chance of making successful inroads. But it is still their satellite, not ours. Tynan declared that our help must be in areas where they feel lacking, such as RF design and, as Feller noted, spectrum management. He added that it was originally planned for the MOST satellite, to carry an Amateur Radio package but that idea was abandoned for several reasons. Daniels commented that wherever we have had a good working relationship with individuals, e.g., at Weber State University, there was a different attitude of the faculty. A discussion followed of past difficulties encountered in establishing working relationships with universities. Daniels opined that a person such as Bob Bruninga, who arrived at the system from the inside, is helpful. Diggs said that was the process going on a week ago at Georgia Tech when Bruninga gave a presentation to a DCE/IEEE group and their well funded Amateur Radio club. He questioned what the goal is for opening the kind of relationship Clark mentioned. Tynan replied that we have three goals, a) to protect the amateur spectrum from inappropriate use, b) to train new AMSAT people who will become part of our technical crew in coming years and c) to promote packages on satellites that amateurs worldwide can use. He agreed with Diggs these are not the usual university goals.

At this point, Haighton proposed that the Strategic Plan discussion be terminated and referred back to VP, Strategic Planning, Bill Burden. He will contact each person who is identified with a specific goal to announce there are a few changes to be made in the plan and to provide a brief report that can be circulated among the Board members to show the status of the work. Haighton announced there was an item that had just come to his attention. That is to perform a periodic review and evaluation of the dues structure. He said this is a part of the strategic plan since it requires that we maintain sufficient resources to meet our vision. He suggested this topic be reviewed before the Budget is approved. Tynan recommended it be discussed under the agenda item, Other Business, to which Haighton agreed.

XV. Business Development Report

Haighton presented the report and asserted that, under the conditions of the past 12 months, AMSAT has done well. He announced the Business Development Committee had provided the ideas which raised $75,000 in the past year. He had talked to Chairman Walter Wittenberg and Vice Chairman Mal Preston and both were convinced that the way we are working through such devices as the President's Club is the way to go; and that attempting to raise funds from foundations is a *hard push*, unlikely to provide substantial results. The possible exception is to approach the ARRL Foundation. Haighton said that he will be working on that in the near future. The Committee's ideas fall into line with what Shep Shepard had said - that we must raise funds from our members. While Haighton disclaimed expertise in fund raising theory, he said the Committee appears to be unanimous in their outlook. And for that reason, we have been pushing the President's Club.

Haighton then asked for additional fund raising ideas, especially if they have been proven effective. Tynan asserted that Haighton had done the right thing in lowering the minimum contribution to for the President's club to $10 per month or $120 per year. He expressed the view that more people with limited means, including retirees, can handle this lower figure. Saragovitz noted that at least 40 people joined the President's Club at the meeting.

Tynan returned to the subject of Life Members, saying they remain a resource we can call upon and he thought it time to send them letters stating the dire condition of AMSAT's finances, and reminding them that they are receiving *The AMSAT Journal* and other services at no cost. He noted that he, and a number of others became Life Members when the annual dues were $5 and Life Membership was $50. He noted that fundraising letters to Life Members serve two purposes. They can raise considerable revenue and they often elicit replies from family members saying that the Life Member is deceased, and therefore can be removed from the rolls. Therefore, he urged that we communicate with the Life Members at least once a year. Saragovitz announced we have a fundraising letter ready to be mailed, although it's not specifically addressed to Life Members. He added it would help to clean up the rolls and suggested the mailing include a self addressed envelope. Baines urged that this be done repeatedly and carrying a different message every time and he asserted there were three different campaigns we ought to be pursuing now. One is the President's Club, one is for Echo and the third is for Eagle. We ought to put out letters throughout the year highlighting one opportunity or the other to repeatedly put in front of people the need for funds. Although they may not respond to the first, they may contribute after the second. He noted that Haighton had repeatedly talked about the President's Club at the Annual Meeting, so he assumed that the 40 persons who responded positively did so because the message was repeated - and they remembered it. He added that every non-profit organization he belongs to, including ARRL, sends multiple letters for a variety of purposes. Thus, we need to plan in advance what we are going to do. He urged that it be made a part of our regular communications with members. Haighton said he wants it to be part of Tillman's plan for Communications. He noted we are now sending two "begging" letters per year, one in late Spring and the other in the fall, plus 10 out of 11 President's Letters on the Web call for extra financial assistance. Baines replied that he appreciated this, but thought that there needs to be a form to fill out with an envelope for return, so that it can be put with a person's bills to pay. Tynan recalled a Put Your Name on a Solar Cell letter that proved successful for P3D fund raising and that we could do the same for Eagle. For large donations, he said, there was a big plaque and every donor received a drawing showing the location of their cell or cells. McFadin reminded the group that this was done also for the spacecraft's batteries. Saragovitz recalled also the "Fly Your Name in Space" campaign by AMSAT-UK, which raised $150,000. Hambly mentioned that we received a firm offer from an anonymous donor stating if we will fly an S band transmitter on Echo they will donate $1000 toward the cost of the parts. Tynan commented that there are many levels of gratification for donors ranging from negative as with the individual who wants to remain anonymous, to those that want a satellite carrying a neon sign with their callsign on it. So, you have to work with each one in an appropriate way. Saragovitz declared that our matching fund campaign was one of the more successful. Clark recalled the humorous idea Rip Riportella wanted to pursue, even before the *Swatch* episode, of selling something to a corporate sponsor relating to the satellite, e.g., naming it "PepsiSat". He advised that, in addition to our fundraising efforts, we need to worry about ways to increase the number of members, perhaps even coupling that, the way ARRL does, to some members-only services. He noted that Echo will require a subaudible code to access the FM repeater on board and suggested we might make "tone of the day" information on the Web site available only to members as do certain terrestrial closed repeater systems. There was little enthusiasm for this idea, and questions were raised of its legality. Clark went on to express the opinion that we need to model our fundraising on those of PBS with their "beg weeks" and matching contributions coupled with our providing gifts of significant value, typically 20% of the amount of

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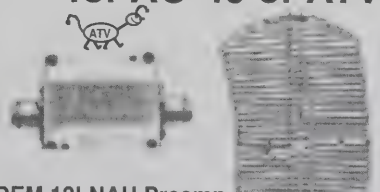

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the contribution. Tynan mentioned that Imlay had told that the Society of Broadcast Engineers hold a yearly membership drive in which a current member gets one chance for every new member they recruit. All of these go into a bin, and the one drawn gets an all-expense-paid trip to their national convention. It was agreed that this is an interesting idea. Hambly recounted his attendance at a convention where money was raised by auctioning gifts that had been donated to the organization. Hambly declared that we need to immediately announce the matching fund for Sun sensors. Tynan declared ANS is the place to do this. Haighton added amsat.bb and said it should appear there within a few days. Clark reminded the Board that unfortunately ANS is formatted for packet radio transmission, so he questioned the propriety of announcing it there. A suggested solution was to have limited information available on amsat.bb and to refer persons to the Web site for details. Haighton offered to provide the basic information so it can be put on the Web.

Clark suggested another idea wherein e-Bay would be used to list items of momentarily substantive value donated by members. The proceeds would go to AMSAT, the donor claiming a tax deduction. The donor would be responsible for providing a digital photograph of the item, along with an accurate description, as well as designating a minimum bid, and establishing the cost for shipping the equipment to the winning bidder. Hambly asked if this activity can be done on an Amateur Radio equivalent of e-Bay? The consensus was that e-Bay is a better place because it is well known and it is worldwide. Details were discussed of how to get this system in place. A volunteer familiar with e-Bay selling experience will be sought. Paige suggested that his daughter could do this. Soifer explained that the tax write-off amount is based on the fair market value and asked what better way is there than to put something up for auction to establish value? It was agreed this fund raising approach should be fully explored, including the possibility that a donor might renege. Tynan suggested forming a committee consisting of Saragovitz, Paige and Bob Carpenter to investigate the approach.

XVI. Auditor's Report

Feller called attention to the audited financial report for the year 2001 prepared by the firm of Verkouteren, Auerbach, Olsen and Co. He reported the audit to be in good condition and asked for motions to accept the report and to retain the services of the same accounting firm for the coming year. Both motions were presented, seconded and passed unanimously. Saragovitz reported the auditors found it unnecessary to comment on any individual item -a desirable situation. She stated that the cost of the audit was $8000. Tynan pointed out it is a requirement and that we are probably getting a bargain at this price. Haighton reported that he had been asked by the auditors to sign the letter of transmittal. He said he wanted to see a plain language version because the language used is difficult to understand by the average person. After receiving explanations and assurances he signed the letter. Feller explained that signing off by the President, Secretary and Treasurer has been a requirement since acquiring the auditors and that the letter states that there are no pending lawsuits and nothing else that would materially change the information. He added that it is a very straightforward requirement.

XVII. AO-7 Operations

Tynan noted that he understood that it is difficult to control AO-7 when the satellite is receiving on 2 m, and for technical reasons control on 70 cm has not yet been tested. It was concluded that VP, Operations Mills will be asked to contact Mike Seguin to find what he needs to command on 70 cm. Pending this finding, a decision to declare AO-7 operational was deferred by a consensus, without a formal vote.

XVIII. E-Mail Voting

Haighton asked if the Board wanted to consider the concept of accepting votes submitted for the annual election of Directors by e-mail? Feller stated that the Bylaws would not require amendment to implement such a procedure. A vote was taken and there were five votes in favor and one opposed (Tynan). Thus, the Board is on record as being conceptually in favor of e-voting. Haighton then suggested that the Board set up a small committee to determine the optimum procedure of accomplishing e-voting. This group should report to the Board prior to any form of implementation. Saragovitz asked, if once a plan is developed, does the Board vote to implement or not implement it? Haighton replied, yes that is the case. He requested that a report be available by the by the next Board meeting. Williamson declared guidance was needed regarding questions such as financial considerations. Haighton emphasized that financial ramifications should be one of the questions the committee should consider. He then appointed the e-voting study committee consisting of Saragovitz and Williamson. Tynan said that he assumed the committee would welcome inputs from interested parties. Saragovitz declared that she would leave technical aspects to Williamson. She will consult with him concerning how the AMSAT office would be affected and what will be needed. For the record, Diggs stated that he supports the concept of e-voting.

XIX. Adjustment and Approval of the Budget

Details of each Budget item were reviewed. These included hamfest receipts and expenses, field operations, satellite operations, publications and education. Haighton declared that the job of VP, Education needs to be defined better. Tynan observed that the position is a Presidential appointment, not a required office. He added that by the next Board meeting, it should be known how the League will work with us on education and that the Budget should be revisited at that time. Clark asked how the budget for Eagle had been changed? Feller replied that it had been reduced from $101,000 to $40,000. Clark next asked about Human Space Flight? Feller said it will remain the same at $37,000 and International Affairs at $2820. Feller pointed out that any personal funds spent for Operations could be claimed as a tax deduction, if that is how Mills wants to handle it. Otherwise, he should request a budget for the department.

Tynan reminded the board that he would like to see more emphasis placed on ground equipment development for Karn's ADCARS (Department 12). Clark asked about the $2000 for Department 12. Haighton replied it is $1000 for components and $1000 for travel. Hambly opined that the entire amount may be needed for "soft" things such as travel. Haighton recommended leaving the amount as is. Daniels asked if the budget items can be reprogrammed within a department? Haighton replied, that managers have that flexibility.

Clark inquired about the $500 budgeted for MOST. Haighton replied that it is a contingency in case MOST runs into any problems up to its launch. In which case, we will be prepared to provide what assistance we can. The $500 is there if someone has to fly to Toronto. Tynan agreed with this and added the MOST people have been very good to us. Clark noted that there is no column for contingencies in the Budget. Daniels noted the uncertainty concerning the Echo launch and how that might affect the $271,000 budgeted for the project. Feller remarked that most of this amount is earmarked for an expected launch in 2003. Baker noted an apparent uncertainty with regard to timing of the payments for the launch, Daniels replied that it would likely require three payments of $50,000 each with the first as a down payment at the time the contract was signed. Baker responded saying, that it seems that the total amount will come due in 2003. Daniels noted that we will have another $50,000 payment due SpaceQuest soon after the first of the year. Tynan observed that more may be known regarding this when the Budget is revisited at the next Board meeting.

Clark asked Feller about the total deficit. The reply was that it is now approximately $336,000. Baines inquired if any of the reserves had been taken yet to pay for Echo? Saragovitz replied that $30,000 has been. As of October 31 the reserves amounted to $520,000. It had been agreed to take as much as $200,000 out of reserves to pay for Echo, so after subtracting $30,000 from the $200,000 available we have $170,000 yet to go. She noted that the value of the reserves is dropping as the market declines. Tynan asked Soifer for his opinion on the possibility of taking funds out of equities? Feller interjected that most of the equities are gone and so mutual funds are what remain. Soifer responded to the question, saying in general that there are 41% equities, 37% fixed income and 2% cash money market. He said that, in general, he is still bearish on the equity market with the downside risk in the next 12 months likely to exceed the upside potential. He added that he is of two minds regarding fixed income securities, expressing the opinion that they are less risky than equities at this time, and that shorter term fixed income securities are the least risky. He declared that the money you are going to have to spend over the next year, should definitely be in cash or its equivalent. Tynan asked if, on rallies, we should be pulling out of equities; to which Soifer replied he would be inclined to do so as a general rule. Saragovitz opined that AMSAT's fund manager, Paul Malone, knows our needs and has been "very good." Feller agreed. Soifer summarized saying that stocks are generally down more than AMSAT's portfolio, so that's the good news. Feller expressed concern about drawing money out of the reserves, some of these funds are more precarious than they were a year ago and given that we are looking at a project costing more than half our reserves, it makes him nervous. Soifer replied that the 40% in equities were down 20-30% he'd be comfortable with that. Haighton expressed the expectation that our major functions such as the Annual Meeting, fund raising and Saragovitz's salary all should do better than break even.

Feller commented that AMSAT holds what may be the least expensive technical conference in the world, with only a $30 registration fee. He asked how much can we increase that to show more profit? Haighton speculated that we might be able to increase the fee somewhat, but first we should look at the projected costs for next year's meeting. He said that Barry Delong is making the arrangements and will be asked to project costs. Haighton noted that the Toronto site is a certainty and the hotel space has already been booked. Feller noted that Toronto is a good place because of the favorable exchange rate. Haighton declared that the idea is to look at expenses and, if we have to increase the registration fee, we will know that in advance. Clark suggested that a fee of at least

50% of the expected $75 nightly room rate would be reasonable. Tynan agreed that AMSAT's registration fee was less than other conferences where people attend in hope of learning things about what they do to earn money, but that is not the case here. Saragovitz commented that the original concept of the Annual Meeting was not be a money making activity, but rather a service to the members. She stressed that this is a hobby group, where individual attendees must pay all their expenses. Employers do not pick up any costs, as is often the case for professional conferences. She emphasized that these travel and lodging costs are significant for many of our members. Furthermore she noted that the fee was raised $5 for the 2002 meeting and, if we hadn't had to rent shuttle buses, there would have been almost a $2000 profit. Saragovitz stated that, to keep the meeting within the reach of the majority of members, she would not like to see the fee raised.

Haighton noted that Toronto is located not far from Buffalo, Chicago, Detroit, Cleveland, the Ohio Valley, Pennsylvania and New York so there is a wide area to draw from. He noted that comments he'd heard over the weekend indicated that many are planning to attend, so the publicity will start very early to build up the attendance and make it profitable for AMSAT. Saragovitz reiterated that the registration fee should not be increased in 2003, since it had just been raised.

Returning to the Budget, Haighton stated that we have $336,000 in expenses of which more than $200,000 is for Echo. He announced that the Strategic Plan requires reviewing the annual dues rate yearly. Tynan opined that he would presently not be in favor of an increase because of the economic cycle and likelihood we would lose many members. He added that dues income is not the place to gain extra money. The place for that is fundraising. Saragovitz concurred. Soifer said if you raise dues now, you are asking each member what are they getting from AMSAT in return? This is not the year to ask that, he maintained. Daniels added that, none of the organizations he belongs to, have raised their dues this year. Haighton said that it has been suggested that we offer members a package deal consisting of AMSAT membership plus enrollment in the President's Club at the Donor Level, and cited how some organizations find this successful because it simplifies the transaction. Clark added that the package could also provide a means to order currently popular publications. Baker noted that we have done this before with success. Saragovitz claimed it would be an accounting nightmare. Hambly related how one organization sends out renewal forms with boxes for ordering publications, as well as for making donations toward various projects. So, our check boxes could be Echo, ARISS, Eagle, etc. Saragovitz reminded the Board that an opportunity to make a donation appears on the second membership renewal form sent as reminder. She then expressed concern about including the same choices we have presented in a mailing sent three months ago. Also, there should be more information provided on the form than just the names Echo, Eagle, etc. Discussion followed with a decision that the President, Executive Vice President and the Corporate Secretary will consider the matter. Soifer recommended seeking the advice of a professional fundraiser.

Baker moved that the Budget, as revised, be accepted. Paige seconded and the motion was approved by a unanimous vote. Feller stated for the record that he "is extremely nervous about the Budget." Haighton commented that his nervousness is well justified, and that he wants to work closely with the Treasurer to make certain that a proper balance is maintained between expenditures and income. Clark declared that we need to plead poverty in our fund raising campaign. It was agreed that this is justifiable. Haighton announced his current letter to the members says, in effect that the reserves are gone. Soifer recalled that is what was done when the Phase 3A spacecraft went into the ocean.

One cost saving proposal suggested was to abandon the PO Box. This would eliminate the expense of the box rental as well as the weekly courier who brings the mail from there to the office. It was thought that we might find another DC address which would be less costly. Haighton declared that he thought that it would be a mistake to change the DC address. It should be either kept or terminated, he thought. Tynan commented on the prestige of having a box with such a low number (27) in DC. Klein offered to periodically check the box for mail in order to eliminate the cost of the courier. Saragovitz expressed disapproval. Haighton stated that the Board would consider the matter in a year.

XX. Other Matters

Baines asked if, to avoid spending so much holiday time away from family, it might be possible to schedule Board meetings to avoid the three day holiday weekends. Tynan replied that when most of the Board members lived in the Washington, DC area, it was felt this was an opportunity to hold these meetings without having to take an extra day off from work. Baines pointed out that now 5 of the 7 present Board members are retired, so the situation has changed. He suggested scheduling meetings a week after a holiday.

Feller brought up the question of ownership of intellectual property. He noted that when members work on projects at their homes, there is no question that they are the owners of any intellectual property created, and that AMSAT is not. But, he said, a question arises when tools, equipment and/or software partially or wholly purchased by AMSAT, are employed to create such intellectual property. In some cases, AMSAT has a significant investment in these tools, equipment and/or software. Feller urged that a policy to handle this be developed and made known. Haighton suggested forming a committee to make recommendations to the Board. He thought the committee should consist of Feller and Soifer. Clark advised that persons who are directly involved should be included, and noted that many of them are dedicated to having as much as they can, completely open source. Thus, nobody would own it. Haighton then suggested adding Wood to the group, as one who had a balanced view. Feller noted that there is a local (DC area) AMSAT member who is a patent and trademark attorney who has offered his services freely. Haighton asked that a preliminary report from this committee be presented at the next meeting. Clark asserted that the action, as proposed, could alienate some very necessary contributors, including all the open source community working on Echo and Eagle who will view this as attack on their open-source beliefs. He thought that there is a serious risk that they will drop out. He maintained this can be prevented by including an advocate of the open source position on the committee, and suggested Bdale Garbee. Tynan noted that the open source concept was adopted by the Board 18 months ago at the Orlando meeting, when it accepted Karn's digital project. He indicated that, to some extent, the same approach applies to Eagle. Haighton responded to Clark's statement, saying he would still like to proceed with the committee and see what they come up with, but agreed that Garbee should be included.

XXI. Review of Action Items

- Klein, King, David Newman and Clark will form a small committee focusing on education and report back to the President.
- Saragovitz will send blank credit card forms to hamfests.
- Bill Burden will contact each individual mentioned in the Strategic Plan regarding possible updates.
- Haighton will send basic information about matching funds to Williamson for display on the Web site.
- Haighton, Hambly, Preston and Saragovitz will "meet" to discuss coupling of renewal forms with fund raising pleas.
- Daniels will check on export licenses for Echo.
- Paige, Saragovitz and Carpenter will explore the donation of equipment for sale on e-Bay.
- Haighton will ask Mills to contact Mike Seguin to learn what resources he may need to command AO-7.
- Haighton will appoint a committee consisting of Saragovitz and Williamson to explore e-voting. They will report at the next Board meeting.
- Haighton will speak with Mills regarding the Operations budget.
- Garbee, Wood, Feller, Soifer and Dan Groper will form a committee to discuss intellectual property and report at the next Board meeting.
- Haighton will discuss with League the following items
  - obtaining more support from the ARRL Foundation for AMSAT's role in the ARISS program,
  - receiving more recognition in their writings of AMSAT's contributions to the entire manned spaceflight concept, including ARISS
  - the cooperative effort proposed for the educational program.
- Tynan will prepare an agenda for the next Board meeting.
- Haighton will send to Baines a copy of the school ARISS contact disk.
- Haighton will write the President's Letter on the topic of ARISS.
- Haighton will talk to DynaCom regarding their 6 inch momentum wheels.
- Haighton will give a list of the new appointees to Klein and *Journal* editor JoAnne Maenpaa.
- Tynan will edit the transcript of this Board meeting.
- Saragovitz will post a list of action items to Board members and other attendees.

XXII. Atta-boys and Atta-girls

- Keith Pugh for his many years of service as VP, Operations

- Andy MacAllister for his many years of service as a member of the Board of Directors and in other capacities
- Barry Delong for his valuable assistance to the President
- Sanlyn Kent and the DeGolyer Elementary School in Dallas for their enthusiasm for the amateur satellite program including the building of antennas in conjunction with the Annual Meeting and Space Symposium.
- Harry Yoneda for traveling from Japan to attend with his family and for his presence which we have enjoyed over the years.
- Bob Carpenter and Bill Hook who have helped out at the AMSAT office for many years.
- Keith Baker who again has been helpful by stepping in during the past year as Executive Vice President

XIII Adjournment

Paige moved for adjournment, Haighton seconded and the Chairman declared the meeting adjourned at 12:15 p.m. on November 11, 2002. ■

In Remembrance: The Crew of Columbia, STS-107

It is with deep regret we announce that three of the crew of STS-107 were hams: David Brown, KC5ZTC; Kalpana Chawla (KC), KD5ESI; and Laurel Clark, KC5ZSU.

We at AMSAT send our understanding and our sympathy, knowing that the exploration of space and carrying out important experiments for the benefit of humanity will continue to be your mission.
Robin Haighton VE3FRH
President, AMSAT-NA

Our thoughts are with the families and friends of the lost crew.
Andy Thomas, Chairman, National Space Centre ARS, GB2NSC, Leicester, England

On behalf of AMSAT-Italy - I send condolences to the families of the astronauts.
Paolo Pitacco IW3QBN
President AMSAT-Italy

On behalf of AMSAT-DL and its membership, we express our deepest sadness and condolences to the families and friends of the Astronauts in America, Israel and India.
Peter Guelzow, DB2OS
Preident AMSAT-DL

The AMSAT-France community sadly expresses its sincere sympathy to the families and friends of the STS107 Colombia crew.
Jean-L. RAULT F6AGR
President AMSAT-F

Its a very sad news to hear about the shuttle accident and loss of crew, more so a great loss to our hamdom. Our heartfelt condolences and prayers to the respective families to give them strength to face this great loss.
Pop VU2POP, AMSAT-India

On behalf of AMSAT-SRI LANKA and its members, we express our deepest sadness and condolences to the families of the Astronauts in STS107 Colombia.
Pranalanka Warunawansa
AMSAT-LK

This is indeed a sad day for the Country, for Israel and or the World as we mourn the loss of space shuttle Columbia and its crew. You may recall that it was Columbia that Owen Garriot flew on when he communicated with the World from space via Amateur Radio - the first ham in space.
Bill Tynan, W3XO
Chairman, AMSAT-NA

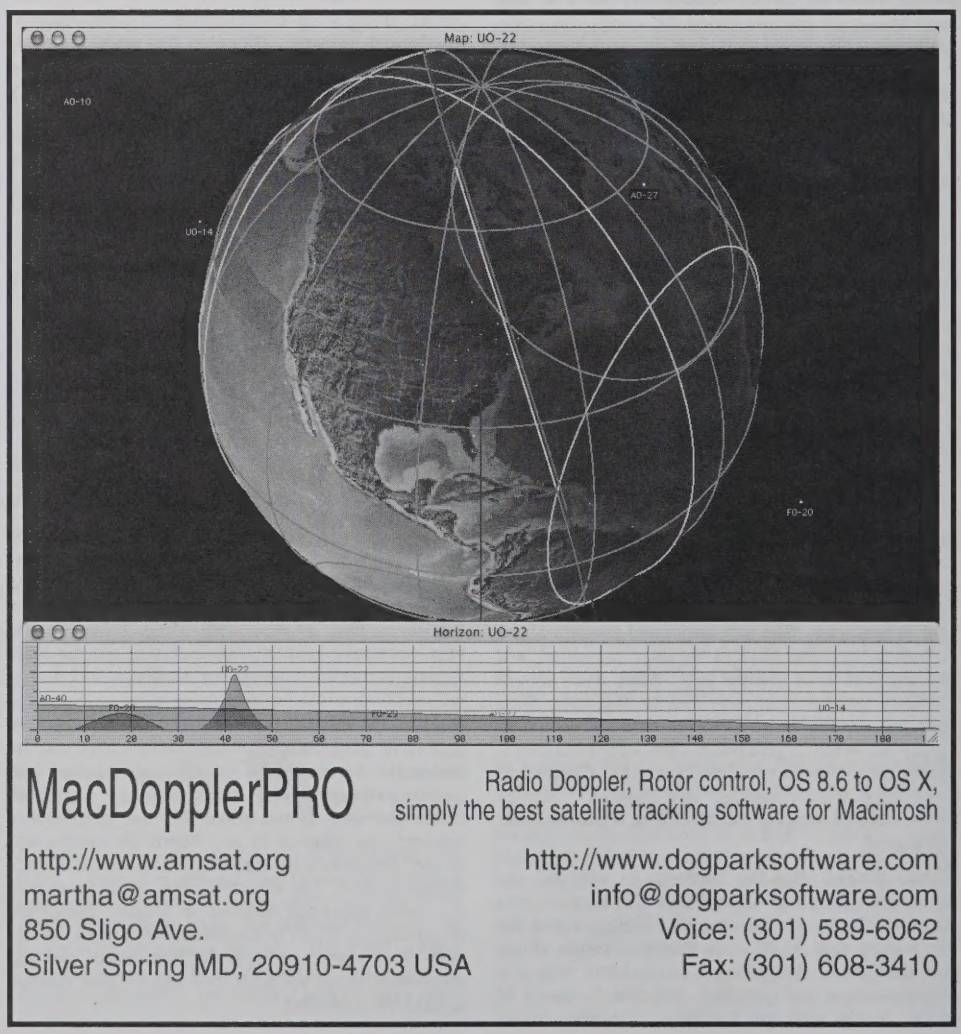
The world has lost 7 great heroes today. On behalf of the entire Amateur Radio on the International Space Station (ARISS) team, I would like to extend our deepest expressions of sympathy to the friends and family of the STS-107 crew.
Frank H. Bauer, KA3HDO, AMSAT-NA V.P. for Human Spaceflight Programs
Chairman, ARISS International

Results of Hardware Tests on AO-40

The AO-40 Command Team announced the results of recent testing on AO-40. Stacey Mills, W4SM reported, "Our first test was a long shot and involved listening for the S1 transmitter exciter stage using Günter Wertich's EME dish. Nothing was heard during a 20 MA window of testing in which the S1 Tx was connected to the middle beacon."

Stacey continued with the good news, "The second test involving the S-band receivers was completely successful. Extremely strong downlink signals were possible using S-band uplink to K-band downlink. Charlie (G3WDG) phoned me and I heard beautiful downlink signals from his ~5 watt uplink to S1. S2 was also active, but because of its higher, less common frequency (2446 MHz), it may not have been tested. The S1 Rx uses the S1 Tx high-gain dish, and the S2 Rx uses the 5 turn helix used by the S2 Tx, so signals would not be as strong through S2 at low squint. Thanks to Charlie, G3WDG; Mike, N1JEZ; and Dom, I8CVS, and any others who participated in this successful test.

The S1 Rx can certainly be listed as fully functional. We will await further testing on the S2 Rx." ■



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Satellite Awards

Bruce Paige, KK5DO, AMSAT VP-User Services & Awards Manager says that congratulations are in order for these satellite operators who qualified for:

AMSAT Communicator Club award
Steven Michalski, KB9UPS
Bruce Maxson, K1DOG

OSCAR Satellite Communications Achievement Award
Steven Michalski, Jr, KB9UPS, #367
Scott Fawcett, KF2ZQ, #368
Tim Murphy, KC8TDS, #369

AMSAT OSCAR Sexagesimal Award
Scott Fawcett, KF2ZQ, #127
Kenneth Ransom, N5VHO, #128

South Africa AMSAT Award
Scott Migaldi, K9PO, #US72
Scott Fawcett, KF2ZQ, #US73

DXCC Certificate for Satellite
Bruce Paige, KK5DO, #280

All AMSAT Operating Award requests should be sent to Bruce Paige, KK5DO at his callbook or QRZ address. (The one exception is the K2ZRO Engineering Award which should continue to be sent to AMSAT HQ. Bruce's article describing all of the satellite operator awards and how you can earn them will be in an upcoming issue of *The AMSAT Journal.* In the meantime you can see these awards on-line at:

http://www.amsatnet.com/awards.html

AMSAT-UK Call for Speakers

AMSAT-UK has announced their 18th Colloquium will be held at Surrey University, Guildford, Surrey, U.K., from Friday 25 July to Sunday 27 July 2003.

This is the first call for speakers. AMSAT-UK invites speakers for topics covering amateur radio space and associated activities for this event. You are also invited to submit papers for the "Proceedings" document which will be published at the same time but printed papers are not mandatory. We normally prefer authors to present talks themselves rather than having someone else give them in the authors' absence. We also welcome "unpresented" papers for the Proceedings document. There will be monetary awards for the best presentations. This year, because speakers are sometimes hard to find, we have relaxed the requirement for a printed paper to accompany the talk; it is not mandatory.

AMSAT-UK also invites anyone with requests for Program Topics to submit them as soon as possible to G3RWL. Invitations for any papers on specific subjects will be included in the future call. Likewise, if anyone knows of a good speaker, please send contact and other information to G3RWL via e-mail: g3rwl@AMSAT.org

Colloquium information is on the AMSAT-UK web pages at:

http://www.uk.AMSAT.org/colloquium.htm

ARISS Chairman Discusses Status Aboard ISS

Frank Bauer, KA3HDO, AMSAT V.P. for Human Spaceflight Programs and Chairman, ARISS International, issued the following statement about the current status of Amateur Radio activity aboard the International Space Station:

"Over the past few weeks the ARISS team has received numerous queries as to when the packet system will be turned back on. We want to thank you all for your concern in getting this important capability up and running again. We realize that it has been down since around the first of the year. We have been working hard with our NASA (U.S.) and Energia (Russian) colleagues to get this operational again, but have only been successful in getting it turned on for about 1 orbit.

I want you to be aware that there are several things that may continue to impede the packet startup.

1) The progress vehicle docked with ISS this past week and the crew is currently unpacking and stowing about a ton of equipment,

2) Parts for the "Glovebox," the science equipment that broke down in December, were delivered on this progress flight. One of the high priority items for the crew will be to fix this device and get the Glovebox science program started again,

3) The crew is working with their mission control counterparts on schedule changes that have occurred due to the Columbia accident.

Given these items that are on their plates and the fact that this crew is not as engaged in ham radio as Valery was on the last Expedition, please do not be surprised if our packet system is not turned on for a bit longer. Also, once it is operational again, I would suggest just use the system in unproto mode since the Expedition 6 crew has not been reading the e-mail on the packet system.

I hope this helps explain the matter."

73, Frank Bauer, KA3HDO

AO-40 Schedule Update

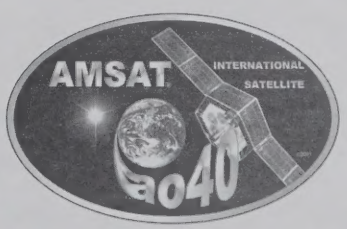
The AO-40 Command Team announced they are continuing to move ALON forward to keep the solar angle within range. The current ALON / ALAT = 15/0 (nominal), and we are slowly moving to ALON =20, but this will take about 6 more orbits. To compensate for the change in squint the K-window has been moved. Further passband shifts will come when we reach ALON=20.

Here is a provisional schedule of things to come:

AO-40's attitude adjustment will continue slowly moving ALON forward toward 45 degrees during the month of March. In early April we will begin raising ALAT toward 20 degs. By mid-April we should be at ~ALON/ALAT = 45/20.

Passband activities will be turned off at that time. We will drift for approximately one month, arriving at ALON/ALAT = 315/20 in mid-May. We will then lower ALAT to 0, restart passband activities (shifted to the early part of the orbit), and begin moving back toward ALON = 0, chasing the sun at the rate of about 1 deg/day. We should return to ALON/ALAT = 0/0 about June 20th. We can stay at ALON/ALAT = 0/0 until early October, when the cycle starts over. Thus, expect the passbands to be off from about mid-April to mid-May, but active at varying phases of the orbit, the rest of the time. We should be in good position for Field Day, just getting back to 0/0.

W4SM for the AO-40 Command Team



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